















**INTERNATIONAL UNION OF PURE  
AND APPLIED CHEMISTRY**

**UNION INTERNATIONALE DE CHIMIE  
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International Union of Pure and Applied Chemistry  
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# INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

President — Prof. J. BENARD (France)  
Vice-President — Sir HAROLD THOMPSON (UK)  
Secretary General — Dr. W. GALLAY (Canada)  
Treasurer — Prof. O. HORN (Germany)

## IUPAC INFORMATION BULLETIN

The Bulletin provides a news medium for the various activities of IUPAC, especially of chemical topics which need regulation, standardization or codification. It includes details of forthcoming international symposia which are to be sponsored by IUPAC together with reports of such meetings which have recently taken place.

The Bulletin is available in 1971 (three issues) at an annual subscription of \$2.50 (£1.00) from the IUPAC Secretariat. Subscribers will also receive the two series of Appendices to the Bulletin: Tentative Nomenclature, Symbols, Units, and Standards; and Technical Reports.

In 1972 there will be two issues of the Bulletin at an annual subscription of \$2.50 (£1.00) with the option of an airmail subscription at \$5.00 (£2.00). Subscribers will also receive the two series of Appendices to the Bulletin.







Prof. J. Bénard (France)



## XXVIth CONFERENCE AND XXIIIrd CONGRESS OF IUPAC

At the conclusion of the XXVIth Conference of IUPAC, held in Washington DC during the period 15th to 24th July 1971, the Presidency of the Union was assumed by Prof. J. BÉNARD (France).

### Curriculum Vitae of New President

JACQUES BÉNARD was born in 1912. He graduated Licencié ès Sciences and Ingénieur diplômé from the École nationale supérieure de Chimie at Lille (1933). Subsequently, he received his Docteur ès Sciences physiques (1939) with a dissertation prepared in the laboratory of GEORGES CHAUDRON.

His rise in the academic world was via Assistant in Paris (1942), Maître de Conférences in Lyon (1947) and then in Paris (1951), full Professor (Chair of Applied Chemistry) in 1956. Since 1962 he has been Director of the École nationale supérieure de Chimie in Paris.

Prof. BÉNARD's scientific work has revolved mainly around crystallography and physical chemistry of metals and inorganic compounds in the solid state, with an increasing orientation towards investigation of surfaces. Important studies have been published on nonstoichiometric phases, particularly iron(II) oxide and sulfides of transition metals; on surface reactivity of metals and alloys in gaseous media; on thermodynamics of reversible adsorption chemistry at metallic surfaces by means of radioactive isotopes; on diffusion in ionic crystalline lattices, especially alkali halides; on surface structure by diffraction of low energy electrons and by Auger spectroscopy. There have been numerous invitations to lecture throughout the world, an indication of the standing he enjoys amongst his colleagues.

But JACQUES BÉNARD has been more than just a chemist and a Professor. He has been President of the Société chimique de France (1967) and active in Société française de Métallurgie, Société de Chimie physique, Centre national de Recherche scientifique français. Always interested in education, he was involved in reform of programmes for preparatory classes in the Grandes Écoles d'Ingénieurs on behalf of the Ministry of National Education, and participated in missions to Lebanon, India, and China for the Ministry of Foreign Affairs.

He has a long association with IUPAC, having served as Secretary of Inorganic Chemistry Division (1951), Member of Commission on Nomenclature of Inorganic Chemistry (1951), Chairman of *ad hoc* Committee and then Member of Committee on Teaching of Chemistry (1964), President of Inorganic Chemistry Division (1967). An Official Delegate of the French National Committee to IUPAC Conferences in Munich (1959), Montreal (1961), Paris (1965), and Prague (1967), he was elected Vice-President (President-Elect) of the Union in 1969. Recently he has chaired an *ad hoc* Committee on Interdisciplinary Matters which made important recommendations to the Bureau (see *Information Bulletin* No. 39, February 1971, p. 87).

Among several honours, he has received the Charles Adam Girard Foundation (1944) and Paul and Marguerite de la Charlonie Prize (1961) of the Lauréat de l'Académie des Sciences, Gold Medal of the Société d'Encouragement pour l'Industrie nationale (1942), and Ancel Prize (1945) of the Lauréat de Société chimique de France. He was made a Corresponding Member of the Danish Academy of Sciences in 1968 and of the Academy of Sciences of Göttingen in 1971.

## Other New Officers

As a result of elections held at the Council meeting on 23rd July, the other Officers of the Union are now:

Vice-President	—	Prof. Sir HAROLD THOMPSON (UK)
Secretary General	—	Dr. W. GALLAY (Canada)
Treasurer	—	Prof. O. HORN (Germany)

An account of the deliberations of Council, together with reports of meetings of all IUPAC bodies held during the Conference, will be published at the end of 1971 as *Comptes Rendus XXVI Conference* (details to be announced later).

## XXIIIrd IUPAC Congress

The Conference was followed, in Boston from 25th to 30th July, by the XXIIIrd Congress of the Union. It provided a forum for discussion of topics at the forefront of organic and macromolecular chemistry by some 3,500 academic and industrial scientists. Rapid publication of many of the invited lectures has been made possible by the provision at the Congress of manuscripts suitable for printing by photooffset (see inside back cover).

At the Plenary Opening Session greetings to the participants on behalf of President NIXON were conveyed by Dr. C. H. GREENEWALT, Chairman of the Organizing Committee. Former IUPAC President Prof. W. A. NOYES JR. then introduced the new incumbent of that Office, Prof. BÉNARD. The latter, in a brief speech, said that the Union must continue with its traditional tasks of regulation, standardization, and codification, so indispensable for the harmonious development of international chemistry. However, science had become, by the path of technical progress, one of the most important driving forces in the evolution of human society. Wherever the role of chemistry was in question, IUPAC was unique in being able to make decisions known—through its groups of experts, internationally recognized—in all sincerity and independent of economic or political considerations. The Addresses given at the Plenary Opening Session by Dr. P. HANDLER and Dr. R. CONNOR are reproduced here in full—some matters of increasing concern today were raised.



## THE DEFENSE OF SCIENCE

**Philip Handler, President  
US National Academy of Sciences**

I choose to address you as leaders of worldwide opinion whose assistance I seek in defense of science.

Only yesterday, no such defense seemed required. The tinkering, inventor folk-heroes of our past had been replaced in part by a new set of household names—EINSTEIN, OPPENHEIMER, WATSON and CRICK. Science-based technology was accepted as a cornucopia from which only good could flow and it seemed that TOYNBEE had indeed expressed the modern credo 'Our age will be remembered because it is the first generation in which mankind dared to believe it practical to make the benefits of civilization available to the whole human race.'

Quite unexpectedly, we are now confronted with the vision of science and technology as a modern Janus—a two-faced god. We are told that when we consider atomic energy we should envisage apocalyptic nuclear extermination, radioactive wastes, and harmful genetic mutations; that industry, particularly chemical industry, equates to pollution of air, rivers, and streams; that fertilizers, insecticides, and pesticides developed for agricultural productivity bring contamination of our food and of earth itself; that mass-produced personal transportation is the major source of air pollution; that the educational potential of television has been transmuted into both the idiot-box of crass commercial materialism and a means of central thought-control; that the wonders of the new pharmacopoeia evoke only visions of malformed infants; that what we regarded as the triumphal selection of foodstuffs in every supermarket conveys possible carcinogens and mutagens; that micro-miniaturization of electronics connotes loss of privacy and a depersonalized machine culture; that our growing understanding of the human brain and of genetic mechanisms can bring tyranny; that sanitation and medicine bring overpopulation and human degradation; that steroid contraceptives promote licentiousness and destruction of the family.

These views were brassily stated by PAUL GOODMAN, 'Inevitably, given the actual disasters that scientific technology has produced, superstitious respect for the wizards has been tinged with a lust to tear them limb from limb.'

A more reasonable statement is that of HARWOOD, 'Science and technology must not be rampant, irrepressible forces to which man must meekly submit. The challenge is not where technology is blindly leading us, but how can science and technology help get us where we want to go?'

### **The Attack on Science**

Scientists generally have agreed with GLENN SEABORG that 'knowledge is born without moral properties. It is man who has applied it according to his acquired pattern of behaviour. Man, not knowledge, is the cause of violence.' But that is too facile. If it be true that 'science is what scientists do', then the latter cannot escape the responsibility to make known the conceivable consequences of their newly gained understanding when they have the foresight and wisdom to do so. After Hiroshima, ROBERT OPPENHEIMER said that 'For the first time, the scientist has known sin.' But he said it in tortured retrospect whereas there are all too few examples of successful monitoring of social behaviour led by the scientific community.

What, then, are the elements of the public grievance with respect to science? Foremost surely is the perpetual public failure to distinguish between the intellectual effort of science itself and misuse of the technology it makes possible, whether that be seen as unpredicted effects on population, the environment, or the arms race.

Once again some scientists proclaim that most of the important work of science in revealing the nature of the universe including man himself has already been done. Such predictions have been made in the past—and belied by subsequent history. There is little reason to think otherwise today.

It is difficult to assess the impact on the public view of science of the rise of those cults which emphasize the affective aspects of human experience rather than the cognitive and analytical. How disconcerting that American society supports at least 30 times as many astrologers as astronomers! Nor can we estimate the future impact of those movements which would diminish public esteem of the components of our high culture, romanticizing the underprivileged and promoting the egalitarian, demanding instant satisfaction of sensual wants when science is surely the activity of a special elite.

The scientist may find deep satisfaction in statements like that of Sir BRIAN FLOWERS 'Science, like the arts, gives expression to the innermost yearnings of the human spirit and thereby enriches our lives. It changes profoundly our comprehension of the world around us and of our place in it.' But that satisfaction is shared by a very small fraction of our population. Meanwhile the usual conservatism of social systems retreats from the vastness and hostility of the cosmos revealed by modern astronomy, from the suggestion that, one day, man's brain will be totally comprehensible in chemical terms; from the allegation that, biologically speaking, man is more closely related to the chimpanzee than is the horse to the donkey. It is unlikely that such thoughts would lead to declining public support for science or diminished numbers of students seeking scientific careers, but they do contribute to an increasingly unfavourable climate for public consideration of the claims of science on the public purse, exacerbating the current malaise of science, at least in USA.

Somehow, we must put down the tiresome complaint that fundamental research is becoming progressively more abstract and irrelevant to society. Patently, those who make such claims fail to appreciate the process by which successful innovation arises from continuing interplay between fundamental and applied research, and fail to appreciate the long lead time—never less than a decade—for translation of scientific findings into socially useful technology.

That now we may find some of our accomplishments wanting reflects not failure of science nor its adaptation to technology, but a yet more rapid alteration of our perceived goals, the social equivalent of what sociologists term the 'floating aspiration level' of individual humans. It is precisely because, a decade hence, our goals will again have changed, that nothing can be more relevant than undirected fundamental research—which simply must occupy a substantial fraction of the scientific community if we are to be positioned for that unknown tomorrow.

A small but vocal tide of concern suggests that some aspects of science are best left unexplored. We have already noted the chronic resistance to the intrusion of any new knowledge which might substantially alter previously widely-held views. Currently, this problem has emerged in public repugnance at the possibilities of 'genetic engineering', including production of multiple copies of a single individual by cloning. Quite apart from the far distant

remoteness of that possibility, the fact remains that book-burning was ever evil; resistance to the advance of science at its exciting frontiers is its modern equivalent and not only delays progress, it erodes the moral fiber of the precious, fragile veneer of civilization.

It will, of course, remain for society, collectively, to manage the manner in which the information so gained is to be used. Scientists, no less than others, are repelled by the image of a world populated by multiple copies of idiot laborers, football players or soldiers, or even of EINSTEIN or MOZART for that matter. Nor have we any taste for mass manipulation of the population by the utilization of mind-altering drugs. But society must surely protect the right of science to undertake those experiments by which genuine information and understanding might be acquired, just as society must subsequently determine how such knowledge shall be employed.

There is growing concern for the history of cooperation between the scientific community and the military in every land. Pondering nuclear, biological, and chemical weapons, those espousing the extreme view have argued that, since new knowledge is most easily available to those with political and economic power, and hence, military power, acquisition of new knowledge must inevitably lead to further concentration of that power and, thus, must be inherently evil. Those who so hold, according to HARVEY BROOKS, have replaced the adage 'the truth shall make you free' with the slogan 'beware of the truth, for it can be used to enslave you', an unworthy, unconstructive conspiratorial view of our society. Still, in this country, it does raise the question of what fraction of the research endeavor should be funded through a central research authority—as in Britain—and what fraction through mission agencies, particularly, the Defense Department.

For my part I insist that a substantial portion of the effort, even on campus, should be funded through the mission agencies both so as to enhance their mission capability and assure awareness of agency problems among the external technical community. But I also believe that we have overdone this and that we should look to the day when an adequately funded National Science Foundation—or its equivalent—provides no less than half of the federal support of basic research.

If science is to find support from the public exchequer at a level greater than that which it would receive as a purely cultural endeavor, there is a continuing burden to demonstrate its relationships to social need. Unfortunately, as we have noted, for fundamental research, that relevance must, in large measure, really relate to as yet unperceived needs. Yet, one can readily sense a loss of public faith in the belief that science is the principal instrument for alleviating the condition of man. Immediate allocation of all possible resources to the amelioration of domestic and international problems is demanded—as if we already possessed all the information and understanding required.

Hence, those who would further the cause of science must understand that, however glorious and uplifting some of us may find the intellectual edifice of science, it can be protected against attack only with the understanding that whereas science cannot determine the values which direct political choices, neither may science seem totally irrelevant to them. And this places a heavy burden upon those who purport publicly to speak for science, *viz.*, to assure that their attempts to be persuasive are free of excessive hyperbole and of dangerous overpromising.

I do not wish to leave you with some exaggerated notion of what is called 'The plight of American science'. Federal funding for fundamental research



has declined from its high in fiscal year 1967 by perhaps 20% in constant dollars.

The funding difficulties so painfully perceived in many research laboratories stem rather from the fact that this system, with earlier federal encouragement, has been operating so as to double the available scientific population in each decade. And still they come. The pipelines are still full—graduate student enrolments alone have begun to diminish—but it is no longer clear that they will readily find suitable employment. I trust that we shall seriously need most of these young men and women one day, even though it would probably be well to reduce our annual output somewhat. Should that not prove true, should there not be appropriate jobs for them, then this country will have fallen off the track of true progress. Much as policy for fundamental research must admit that it is directed towards the requirements of society a decade or more hence, so too, must our policies for support of graduate education—which must not be blinded by transient episodes such as the current, temporary I trust, episode of technological unemployment. Meanwhile, we may serve as an object lesson to the rest of the world, even if each nation views that lesson somewhat differently.

In the Western World, we are now living through a transition from the time in which all major decisions affecting our national lives were made in a market economy to a time when, inevitably, most such decisions will be taken in the public sector of a mixed economy. That we are woefully unskilled in this art is all too evident, nor is it clear that Eastern nations are more capable than we. No nation known to me can really boast a rational, national plan, as to how it shall address its national technical capabilities to the battery of problems, domestic and international, which demand technical solutions. Yet every nation can readily identify such problems. Let me cite just a few with obvious implications for chemical research.

### Health Care

One can fashion an impressive list of all those diseases for which research has already provided definitive, therapeutic or preventive measures. In the main, these are nutritional deficiencies, infectious processes, and endocrine disorders. The cost of the earlier research and the current costs of dealing with these diseases are trivial as compared with the human and economic costs when each was a major affliction of mankind.

In contrast, the diseases which currently take serious human toll are those which are now understood insufficiently to offer a basis for definitive prevention or therapy. And it is the less than satisfactory, terribly costly palliative management of these diseases, utilizing what IVAN BENNETT has termed 'half-way medical technology', which is what one usually means by 'health care'. How comparatively trivial are the costs of research!

But how long and difficult the task is. Is it not remarkable that, no attention has been paid to the fact that 1970 offered proof that it was possible to abolish a once devastating disease? For the first time in recorded history, last year, not a single case of smallpox was reported in 20 African nations receiving US aid in a WHO-organized eradication program. That event may go unnoticed in political history, but in the real history of mankind it represents one of man's truly great triumphs over his ever-hostile environment. I cannot, in good conscience, promise that research will do the same for cancer, heart disease, stroke or multiple sclerosis—but I can guarantee that if we do not try, those afflictions will continue unchecked.

## The Environment

The fever pitch of national, indeed international, concern for the environment is a phenomenon which future historians must evaluate in the perspective of man's occupancy of our planet. The universal intensity of these feelings probably arises from the fact that, at some time, each of us feels threatened by environmental disaster or offended by unsightly cities or landscapes. Yet, even now, man's effect on the general environment is trivial as compared to that of natural forces.

Consider the effects of climate, erosion of continental surfaces by rivers and streams, the emanation of the terpenes from pine and cedar trees which long ago led man to name regions of the Appalachians as the Blue Ridge and the Smokies. Consider the lovely landscapes of England which were fashioned in the last several centuries from primeval forests, or the magnificently tilled hillsides of France, Italy, and Japan, all of which were fashioned by the hand of man. Or the great, rich loam of our own prairies—the consequence of centuries in which the Indians burned over the native vegetation as a means to drive the buffalo; to say nothing of earthquakes, tidal waves, or landslides.

Man and nature have ever been altering the total environment. Even now, our overgrown, blighted cities are cleaner and healthier than were urban agglomerates anywhere in the world until the middle of the last century. We have not suddenly begun to alter the environment. Our entirely justifiable concern arises from the concatenation of our ever increasing numbers, marvellously productive heavy industry, and increasing *per capita* disposable income. Happily, the very affluence which generates environmental difficulty also permits us to direct our efforts toward its abatement, to consider reversing untoward processes which, in some nations, have been in train for many decades, only a few of which have yet attained genuinely crisis dimensions and, hopefully, in developing nations to avoid the problem entirely, without limiting the rate of real development. The problem is whether acceptable solutions can be implemented in a market economy when—until now—the environment has been utilized as a 'free good'.

Many current problems can be handled reasonably well with available off-the-shelf technology, as it were, although we have not yet established the social mechanisms whereby to bear the costs or agreed on what we shall forego so as to do so. *My special* plea is that we do not, out of a combination of emotional zeal and ecological ignorance, romanticizing 'good old days' that never were, hastily substitute environmental tragedy for existing environmental deterioration. Let us not replace known devils by insufficiently understood, unknown devils, as when phosphate in detergents is replaced by inadequately evaluated substitutes or even sodium carbonate, or when, tragically, highly toxic parathion was substituted for some uses for too stable, but relatively innocuous DDT. The brute fact is that ecology is, as yet, a young, little developed science which requires much nourishment before it can adequately serve society. But ecology does insist on the complex inter-relatedness of ecosystems and the lesson to those who would attempt simple solutions to environmental problems is 'Use well and study carefully before shaking!'

## Energy

The analyses of the energy problem which I see invariably strike me as being dreadfully short sighted. So-called 'long-term' projections extend to the year

2000 or even 2100—when I expect mankind to be walking the earth in the year 200,000. On that time scale, without exquisitely careful international planning, there may be insufficient quantities of any natural resource other perhaps than oxygen.

Is it not almost sinful, that a few generations of men will have consumed, all of the petroleum and later the coal, accumulated over 3 billion years, as a source of energy, thereby denying our progeny of this unique raw material for chemical industry? Can we become wise enough to husband this unique resource before its exhaustion? And yet energy production and utilization lie at the heart of our civilization. Each of us cherishes his personal transportation, and although we shall surely manage to reduce the air pollution engendered by the internal combustion engine, no truly acceptable substitute for petroleum as a fuel source for an equivalent mode of personal transportation has yet become evident.

Electric power drives our civilization. For well known reasons, the projected increased demand for such power, worldwide, is unlikely to be met by combustion of fossil fuels—which need be conserved, in any case. Hence, nuclear power plants, whether of the current variety, the breeder reactors under development or the ultimate of controlled fusion must soon become absolutely essential to our way of life since most of us regard a return to more primitive times as really quite unacceptable. But then we shall be left with the problem of disposal of radioactive wastes. Patently we are not really a consuming civilization, but a processing one, generating vast quantities of waste which demand disposal. With sufficient ingenuity we can devise means for recycling much of it. But that will, necessarily, require expenditure of yet more energy. Thermodynamics permits no way out of this dilemma. Hence, early resolution of the conflict between the suppliers of energy and the environmentalists must soon occur. This difficult, inherently political, decision must rest on an adequate, comprehensive, objective, technical analysis of these problems. Unhappily, none is yet available.

## Population

The planet's population problems need no longer arise out of concern for our ability to feed ourselves. They may arise, in part, from our growing inability to provide useful employment to a fraction of our fellows because the others will be so productive, as well as from the impact of our very affluence on the environment and supply of raw materials if future generations are to live at least as well as do we. In the economically underdeveloped world, population growth is *the* deterrent to improvement in the quality of life. Ironically, it is almost sad to realize that, thanks to the 'green revolution', MALTHUS was wrong. We shall almost certainly be able to feed a world population which is intolerably large by any other criteria. But surely starving people to death cannot be the solution!

Here again, research has scarcely begun. The first generation of mechanical and chemical means of contraception, remarkably successful as they have proved, will certainly not suffice. Although, even now, lack of acceptable social mechanisms is a principal impediment to population control, no such program can succeed without simpler, cheaper, safer, more reliable methods and these can derive only from better understanding of reproductive physiology and a substantial chemical effort. Nor should it be thought that the task of agricultural research is complete. On the contrary, this endeavor has no end; its very successes always brings yet more problems.



Thus we stand at a strange crossroad. The pattern and quality of life, the world over, is largely the product of past research. In some of the very areas where, in the past, we have been most successful, the direction of future efforts is now in question. To be sure, some of the most exciting visions in the history of man, such as those of molecular biology, have as yet found little application. But I see no reason to believe that the findings of science tomorrow will be any less applicable to human affairs than were those of yesterday. Meanwhile, this brief survey of requirements and opportunities for research on the assemblage of problems of disease, transportation, the environment, resource use, energy, waste disposal, and population control should be all the demonstration required of the relevance of research.

### **The Planet as a System**

The view of earth from space brought home how small our planet really is, and gave stimulus to a new discipline—systems analysis of the entire world biosphere. Such studies seek to understand, by computer modelling, utilizing as many parameters as can usefully be invoked, what the longer term history of our planet may be. This discipline is in its infancy, and it is hoped that it will yet mature sufficiently to become a useful guide to political action. If so, it may yet force adoption of a true world government. Those so engaged have assured themselves that we really do live in a period of sharp transition between the past and the future, ‘the hinge of history’, in the sense that decisions taken in the next few years may make for irrevocable commitments concerning the future of mankind.

PECCEI summarized it thus ‘. . . the responsibility of controlling technology and through it of regulating the ecosystem itself, now rests on man. . . . He must now take upon himself functions in the cycle of life which up to now were reverently considered to be the prerogative of nature or providence, and left to their inscrutable designs. The physical world and the biosphere are now so pervasively interfered with by man’s actions that he has no other alternative but to accept the responsibility of being, himself, the enlightened manager of his terrestrial kingdom.’

After the battle of El Alemain, WINSTON CHURCHILL said ‘This is not the end; it is not even the beginning of the end, but perhaps it is the end of the beginning.’ Hopefully, the history of man has come to the end of the beginning. This may well be a hinge of history whose outcome will determine whether man is to have a glorious future or return to darkness. If we are fortunate and wise, science may yet be the means to set man free.

## FROM KNOWLEDGE TO USE

Ralph Connor, Vice-President  
Rohm and Haas Company

It seems to me that most talks dealing with pure and applied chemistry, the subject I have been assigned, begin with definitions of these terms, which generally indicate that pure chemistry is undertaken for the purpose of gaining knowledge, while applied chemistry is undertaken to obtain useful results. The distinction is based primarily upon the motives for the work rather than upon the laboratory techniques, the apparatus involved, or the complexity of the problem. Even the motives for the work do not provide a very simple differentiation. Certainly, those people who do research primarily to obtain new knowledge do so because they believe that this will, in the long run, contribute to the betterment of civilization and, certainly, applied chemistry often contributes new knowledge.

Perhaps the simplest way to explain my remarks is to say that I am going to compare the kind of research with which I have been associated for the last 25 years (which I am sure you would all consider applied research) with the kind of research which I did as a graduate student and, later, as a member of the staffs of universities (which I believe could qualify as pure research). Mostly, I will characterize applied chemistry because I believe most of my audience will be less familiar with it than with pure chemistry.

Since the objective of applied research is utility, the first step before undertaking applied research is to determine what is needed. Having determined what is needed, we must next answer the questions: (1) Can we tell if we have met our objective, and (2) What are the chances of success? From this point on, the procedures of applied research become like those of pure chemistry. Let me elaborate on these two questions while describing some of the similarities:

### *First*

In all research, both pure and applied, our rate of progress is roughly dependent upon our ability to measure something—the elemental composition of a product, the adhesion of a film, the proteolytic activity of an enzyme or the weatherability of a polymer. We must know in advance how to characterize our results or be prepared to do research to develop such methods.

### *Second*

Similarly, all research builds upon what is known. The chemistry that we have learned leads us to think that it is possible to achieve something new, either in pure or applied chemistry. In applied research we must feel that enough is known to indicate that we have a reasonable chance of meeting the objective under consideration. Often the conclusion will be that the chances of success are too remote to justify trying to meet the objective; for example, we might conclude that transparent stainless steel would find many uses but that the knowledge of how to achieve it is so limited that this would not be a promising research project. Often, we will conclude that there is not enough basic information to be *sure* of meeting the objective, but that there is enough available to be encouraging and that the first task must be to obtain additional basic information. For example, we might decide that, if we had more knowledge about the thixotropy of polymer systems, we might be able to

devise superior protective coatings and we might undertake a fairly basic study of thixotropy before making a decision to seek specific products. Sometimes—but this seems to me to be true in a surprisingly small number of cases—we will find that we consider that there is a good probability that we can meet our objectives by the application of basic information that is already available.

### *Third*

Once a research problem is undertaken, synthesis and many of the measurements are carried out by similar procedures and in similar equipment, whether the research be pure or applied.

### *Fourth*

Either type may be carried out with imagination and skill; either can be done in a routine and unimaginative way. The quality of the work depends upon the ability of the chemist. When I was a teacher, I thought that my best students should go into pure research, and that those who were not quite so good would find their place in applied research; it was only when I began to have some contacts with applied research that I began to form other opinions. With a few rare exceptions, my experience has been that the best men for pure research turned out to be the most competent in applied research, and the men who have been successful in applied research would also have been successful in pure research. There are reasons why this should be true: I shall give only one.

Let me again remind you that in evaluating an objective in applied chemistry, one criterion is 'What are the chances of success?' A man who does not know chemistry thoroughly will, in applied chemistry, miss opportunities or undertake ill-advised projects.

So much for the similarities in pure and in applied chemical research. Earlier, I said that they were undertaken for different reasons; another difference is in the disposition of their results. The results of pure research are expected to be made known widely to other chemists, through publication; the results of applied research must be acted upon by someone else.

A successful project in applied chemistry has shown that chemical knowledge can be made useful but *it is not yet useful*; someone must provide facilities for using a process or producing a product and there must be some system for providing the product of the facilities to the final user. Good pure and applied chemistry depend upon others—often not chemists—if they are to benefit mankind.

When I first began to consider what I might say on the relationship of pure to applied research, I regretted that I had agreed to give this talk. It seemed to me at first that, considering my own background in US industry and considering that we have come from so many different countries with so many differences in social, political, and economic conditions, it would be hopeless to try to say anything that might be appropriate for an international meeting. However, as I thought in more detail, I discovered what I should have realized in the first place—that chemistry is independent of nationality, politics, and social customs. It seems to me that what I have said about applied chemical research is true throughout the world. Such differences as there are among nations are concerned primarily with the decision-making processes and not with the role of applied research.

In closing, let me summarize the relations between pure and applied chemistry as I see them. Applied chemical research is one step in the con-



version of knowledge to utility and one of the essential steps in the sequence by which pure chemical research can be used to improve the life of society. If we are to be successful in applied chemistry, we need good basic research to provide the knowledge upon which we can build. Good pure chemistry can be conducted without applied chemistry *but it is not likely to benefit anyone unless it is followed by good applied chemical research*. Perhaps the founders of this organization recognized this relationship when it was founded as the International Union of Pure and Applied Chemistry.

## REPORTS OF IUPAC BODIES

### COMMISSION ON AUTOMATION OF SECTION ON CLINICAL CHEMISTRY

Birmingham, UK, 29-30 April 1971

*Present:* Dr. M. C. SANZ (Chairman), Dr. K. JØRGENSEN, Prof. T. P. WHITEHEAD.

#### New Members

The experience of Dr. COTLOVE (deceased 13 September 1970) would be greatly missed by the Commission. His successor at the National Institutes of Health in Bethesda, Dr. D. YOUNG, might be the best replacement candidate. In any case, the Commission should have a Titular Member from USA.

#### Recommended Nomenclature for Automatic Analysis

A letter to the Commission on Analytical Nomenclature was drafted, listing the recommended terms that could be accepted without modification, the recommended terms for which the explanation should be rewritten in the light of recent developments, and some additional terms needed but not yet defined. This letter, to be circulated by Dr. SANZ, would be the basis of joint discussions between the two Commissions in Washington during the XXVIth IUPAC Conference.

#### Report on Automated Analysis

Part 1: Minor alterations in the present text were suggested to make this general survey fit the rest of the report.

Part 2: This should include the terms already recommended by the Commission on Analytical Nomenclature, preferably including the modifications suggested above. The clinical chemistry list of terms is based mainly on the *Glossary in Recommended Scheme for the Evaluation of Instruments for Automatic Analysis in the Clinical Biochemistry Laboratory* (issued by the British Medical Association in *J. Clinical Pathology* **22**, 278 (1969)). This glossary was thoroughly revised during the course of the meeting.

Part 3: A guide for evaluation of instruments could be based on the previously mentioned British publication, but some revision was essential.

Dr. JØRGENSEN would prepare a draft report for the Washington Conference. In this connection *Recommendations for the Presentation of the Results of Chemical Analysis* from the Commission on Analytical Nomenclature should be taken into account.

#### Future Activities

The above report should be ready for publication in tentative form after the Washington Conference. The Commission should then consider the electronic data processing aspects within automated analysis.

M. C. SANZ



## SECTION ON OILS AND FATS

St. Gallen, 1-2 July 1971

*Present:* Dr. E. HEINERTH (Chairman), Mr. H. J. VOS (Secretary), Dr. G. LOEW, Dr. K. A. WILLIAMS (Titular Members); Dr. J. A. CORNELIUS, Dr. H. HADORN, Prof. M. NAUDET, Mr. A. PETERSEN, Mr. J.-P. WOLFF (Associate Members); Dr. H. BRÜSCHWEILER, Mr. S. B. LINTZ CHRISTENSEN, Prof. C. PAQUOT, Mr. B. MCGWYNNE, Ir. J. B. ROOS, Dr. R. OHLSON, Dr. A. D. SCOTT, Dr. M. TEUPEL (National Representatives); Dr. H. U. BRÜGGER, Dr. C. CAROLA, Mr. P. W. HENDRIKSE, Miss B. JACOBSBERG, Dr. H. KÖHLER, Dr. E. KURUCZ, Dr. P. R. E. LEWKOWITSCH, Dr. Ö. LEVIN, Mr. A. T. MØLLER, Mr. J. C. VAN DER WEEL, Dr. H. H. R. H. WENDT (Observers).

### Membership

The nomination of Dr. D. E. U. EKONG (Nigeria) as a National Representative was approved unanimously. Mr. MCGWYNNE reported that Mr. T. W. BREADEN (Associate Member) had resigned: no successor was appointed as yet.

The participants unanimously agreed to a proposal to have the Secretary, Mr. VOS, reelected for another period of 2 years because of the various problems which he had to solve in the near future. It was possible that Mr. A. PETERSEN (Denmark) would take over the Secretaryship of the Section at the XXVIIIth IUPAC Conference (1973).

A proposal to divide the Section into two Commissions—VI.3.1: Commission on Oils and Fats, VI.3.2: Commission on Soaps and Oleochemicals—was accepted unanimously. Everyone agreed that by forming the two Commissions the activities of the Oils and Fats Section as a whole would be broadened. The Secretary of the Section was nominated as Secretary for both Commissions. It was not possible to discuss the future activities of the Commissions in full detail at this meeting, but it would be done as soon as possible.

### Results of Collaborative Investigations

(a) *Determination of Melting Behaviour of Fats (Intervalle de fusion)*—Method proposed by French Delegation. The results obtained were quite reasonable. The main problem would still be pretreatment of the sample, because the final form in which the fat was crystallized, determined not only the melting point as such, but all other characteristics of importance for the melting behaviour, DTA, NMR, and dilatation. It was decided to continue the study on the basis of a revised text (with a new procedure for pretreatment of the fat) and with new samples.

(b) *Determination of Chlorinated Pesticides in Edible Oils and Fats*—Sub-Committee under the Chairmanship of Prof. E. L. DELVAUX (Belgium). The results obtained were very satisfactory. It was, therefore, decided to accept the method of Mills (with some slight modifications) as a standard reference method. However, because more simple and less laborious methods for routine analysis were also required, it was agreed to investigate amongst others, the methods of Singh and Westöö in the same way as had been done this year with regard to the Mills method.

(c) *Determination of C<sub>18</sub> trans mono-ene Fatty Acids (elaidic acid) by TLC and GLC*—Sub-Committee under the Chairmanship of Prof. PAQUOT (France). The results obtained by the French and Netherlands collaborators on the

methods proposed by them were very promising. It was decided to continue the work with a combination of the two procedures.

(d) *Bleaching Tests for Palm Oil*—Sub-Committee under the Chairmanship of Dr. CORNELIUS (UK). Dr. CORNELIUS reported that, as a result of discussions within the Sub-Committee, it had been decided to continue the work. Special attention would be paid to the peroxides, the carbonyls, the free fatty acids, the quantity of carotene present, and the heavy metals (e.g., Cu and Fe).

### Work Programme 1971-1972

Besides the investigations mentioned above, it was agreed to start projects on the determination of synthetic antioxidants and tocopherols in oils and fats and the determination of solvent residues in crude oils and fats obtained by solvent extraction. Furthermore, it was decided to investigate collaboratively the method of Dr. HADORN for preparation of the methyl esters of the lower fatty acids, including butyric acid, and their determination by GLC as an additional method to the ones already adopted by the Section. In comparison with the Hadorn method, a method proposed by Ing. Roos based on GLC of the *free* fatty acids up to  $C_{14}$ , would also be studied.

It was also agreed to study the possibility of replacing the carcinogenic reagent *benzidine* by the less harmful *p-anisidine*, to be used in determining the benzidine value—II.D.15—adopted and edited by the Section some years ago.

### Texts of Standard Methods

Thanks to the assistance given by the IUPAC Secretariat, it had been possible to make a favourable advance in preparation of the final texts in French and English of a great number of standard methods, adopted by the Section in the last few years, in order to have them published as soon as possible. Some of them had already received the endorsement of the Division President.

However, with regard to publication the participants were unanimously of the opinion that the proofs should be corrected and controlled by the French and English Delegations with respect to the French and English texts, respectively.

Regarding the question of whether the texts of the methods should be published in book form or in loose-leaf form, the participants agreed with the proposal of the Netherlands Delegation to retain the loose-leaf form because this would be far more practical. Furthermore, it was agreed that it should not be necessary to purchase a binder for the leaves; a binder could be bought by users in their own country. It was decided that the leaves should have the same size as those of the 5th Edition and that they should not be perforated.

Concerning the language to be used for the texts of the standard methods being edited in future, all participants preferred to have them published in *both* English and French. Taking into consideration that Codex Alimentarius, ISO, and CEE were all using at least two different languages for their documents, amongst which there were always French and English, the Oils and Fats Section believed it would be a retrograde step if the texts of its standard methods were published by IUPAC in English only. Furthermore, IUPAC should take into consideration that there were a number of African countries where the French language was the only foreign one to be understood by the people. Whatever the final decision of the IUPAC authorities on this matter might be, all texts of standard methods already in preparation and in French and English, should be published in these two languages.

## Relationship with ISO

It was concluded that the contacts of the Section with various ISO commissions were generally reasonable but it was hoped that in future the situation could be improved further.

## Dates and Place of Next Meeting

The next meeting would be held on 6th and 7th of September 1972 in Chester, UK, by invitation of the UK Delegation.

H. J. Vos

## AD HOC COMMITTEE ON BAD PATENT PRACTICES

Washington, DC, July 1971

The organizational Meeting of the Section on Medicinal Chemistry, held in Zürich on 13-15 February 1970 (see *Information Bulletin* No. 38, November 1970, pp. 17-24), appointed an *ad hoc* Committee made up of Dr. M. PROTIVA and Dr. F. L. ROSE to investigate bad patent practices, and more specifically as they related to so-called paper patents in which compounds were seemingly disclosed and became indexed in the chemical literature, but which had never, in fact, been prepared. It was felt that the situation was particularly acute in the field of medicinal chemistry. The *ad hoc* Committee was instructed to gather facts and report.

## Actions Taken

1. Dr. PROTIVA had supplied four instances from *Chemical Abstracts* (1962-1967) in which patent specifications disclosed compounds or series of compounds which may not, in fact, have been prepared and isolated, or at best, were inadequately characterized. All cases were from the steroid field, and Dr. PROTIVA mentioned that he had not found examples of this practice amongst non-steroids.

2. Dr. ROSE had been in correspondence with the following organizations concerned with the abstracting and recording of chemical material from patent specifications, to determine the extent of the problem, and the manner with which it is dealt. Additionally, Chemical Abstracts Service was approached by Prof. CAMPAIGNE.

- (a) United Kingdom Chemical Information Service (Dr. W. E. BATTEN)
- (b) Chemical Abstracts Service (Dr. R. J. ROWLETT)
- (c) Derwent Publications Ltd. (Mr. M. HYAMS)
- (d) Institute for Scientific Information (Dr. E. GARFIELD)

## The 'Paper Example'

1. *Definition*—In most patenting countries, the appearance of a named compound, even if fictitious, in a specification constituted disclosure. If it was associated with a product claim to that specific compound, together with claims addressed to particular useful properties, then thereafter no other party had rights to that compound in a new patent specification, except in as far as they could show (to the satisfaction of the patenting authority, as and where applicable in the country concerned) that they had a novel, valuable, and unexpected use for it. But even so, the compound and the



claimed routes to its preparation, remained the property of the original 'inventor' who might, or might not (again according to national patent legislation) grant licences for its manufacture for the later purposes. Additionally, some patent specifications claimed fictitious compounds as intermediate preparations, or more commonly perhaps as intermediate substances that actually existed, but which were not isolated and identified. Clearly, both practices were objectionable, not only because they might deny a later true and rightful inventor the full reward for his work, but also because literature registration records would be in error.

These practices contrasted with the perfectly legitimate practice, based on the premise that a useful property discovered in respect of some compounds actually prepared was often the characteristic of a group or family of compounds, and although it was possibly optimum in one specific member of the series, it might be considered an unreasonable requirement (from the point of view of the patent applicant) to insist on the preparation of every conceivable variant. (At the same time, he should be careful to ensure that he did not include within the structural definition any inactive compound.) In practice, most initial claiming was on a fairly broad basis which might become restricted by subsequent 'office action', or where a provisional specification was allowed, in the time between lodging the latter and the complete specification.

2. *Detection*—This must be largely subjective. The absence of definitive physical and analytical data would be regarded as a suspicious circumstance. On the other hand, a 'composition of matter' might be just that, and perhaps impossibly difficult to define in precise terms. Moreover, the completely unscrupulous applicant would not hesitate to make use of the considerable power now in the hands of the chemist, to predict with fair accuracy the spectral properties (infrared, nmr, ultraviolet, mass, *etc.*) of a hypothetical compound. Even melting point could be estimated, and if challenged, particularly if the quoted figure was low, it could be excused as due to the well-known effect of trace and not unreasonably present, impurities.

3. *Treatment*—Until recently, Chemical Abstracts Service policy had, understandably, not been uniform in respect of questionably spurious compounds, but fairly specific rules were now applied. Every compound that was indexed in *Chemical Abstracts* was also recorded in the CAS Chemical Registry. Because of the growth of the chemical literature, *Chemical Abstracts* no longer included in actual patent abstracts, every compound disclosed. The index entries were, however, prepared from the original patent and included therefore all compounds for which definite data was disclosed. To warrant such an entry, a compound must be new or have new information reported about it; there must be some documented facts, such as, elemental analysis, melting or boiling point, more than a single-line spectra, quantitative biological activity, or some definite described use. Unsupported statements of yields or uses for a known compound were not sufficient reasons alone for indexing. Examples which were included in generic structures, or were said to have been 'similarly prepared', were not included, but in this connection, attention must be directed to the Subject Index of *Chemical Abstracts* where entries were to be found not only to a compound in question, but also closely related substances which might otherwise be difficult to pick up through the Formula Index alone.

Derwent Publications commented on the special difficulties which arose from the activities of the Dutch, German, and now the French Patent Offices, which published applications prior to examination. Not unnaturally these

documents now contained much material which was extraneous to the true invention, but still relevant to early disclosure and, therefore, of concern to Derwent's customers.

Dr. GARFIELD (Institute for Scientific Information) commented largely to the same effect, but believed that the number of 'paper compounds' which *Index Chemicus* was called upon to handle to be relatively small, but admitted that they could have indexed substances that were not included in *Chemical Abstracts*. He concluded that there was not much that could really be done about it, since it would be an extremely time consuming process to pinpoint every such case.

### Conclusions

In summary, several abstracting services were aware of the existence in the patent literature of examples which seemed unlikely ever to have been prepared, much less characterized in accordance with proper chemical discipline. They were prepared, variously, to concede that the disclosure of paper compounds could create problems for those subsequently seeking *bona fide* patent protection, and to exercise in essence a rule-of-thumb practice in deciding what should or should not be included in an index record. It was clear that in the last resort, a would-be inventor could not rely on these sources for an accurate appraisal of prior art, but must himself refer to the original articles and specifications to verify what was, or what was not, claimed as a new compound. Further, he must use his own scientific judgement to decide whether a claim was valid, and if need be to check it by experimental means.

M. PROTIVA  
F. L. ROSE

## CHEMISTRY FOR THE CONCERNED CITIZEN

The first meeting between the Committee on Teaching of Chemistry and its National Representatives from the Adhering Organizations of IUPAC took place in Washington, DC, during the recent XXVIth Conference of the Union. Three papers were presented under the item 'Chemistry for the Concerned Citizen'. They were well received and are reproduced here for a wider audience.

### AN APPROACH TO UNDERSTANDING SCIENCE IN SOCIETY (IN USA)

The report of Panel IV, *Chemistry for Citizens*, at the American Chemical Society (Division of Chemistry Education) Snowmass-at-Aspen Conference in 1970 listed nine recommendations. All dealt directly with improving communication between scientists in general and chemists in particular, on the one hand, and citizens who are not scientists on the other hand. The late Prof. RICHARD WOLFGANG, Chairman of the Panel, made it abundantly clear that Members of the Panel would not rest until the recommendations were implemented. The Division of Chemical Education responded to Panel IV's challenge and at the September 1970 national meeting of the American Chemical Society in Chicago appointed a four-member Implementing Committee to initiate programs recommended six weeks earlier.

Highest priority was accorded to three of the recommendations of Panel IV. These were:

1. For secondary schools, a program for producing materials for the study of chemistry from an humanistic point of view should be developed.
2. Television programs for the general public should be developed that show in simple terms how science solves and creates problems in our world.
3. Case histories of applied chemistry should be prepared by groups of appropriate experts, in the form of well-documented, almost scholarly position papers for the well-educated group of citizens who are the opinion- and decision-makers of our society.

A National Conference on the Public Understanding of Chemistry was convened at Colorado State University, 12-14 December 1970—just six months after Snowmass, 'To lay plans which could be the basis for proposals to develop (1) a new, humanistic chemistry program for high school and two-year college students who do not contemplate a career in science, and (2) a mass media campaign to increase appreciation by the public of the chemical world in which we live.'

Small grants from E. I. du Pont de Nemours and Co. and from the Research Corporation not only made possible the conference but also enabled Dr. CALVIN VANDERWERF, distinguished chemical educator and former President of Hope College who was spending the 1970-71 year as Professor-in-Residence at Colorado State University, to coordinate the conference and write the proposals to put into effect the two programs. One of those proposals, which I have titled 'Chemistry: An Approach to Understanding Science in Society' with the acronym CAUSS, was delivered to the American Chemical Society in July 1971. ACS will submit it to the National Science Foundation soon. If all goes well, less than a year and a half after the Panel on Chemistry for Citizens enunciated its goals, one of those goals will be well on the way to fruition.



At Colorado State University last December a follow up conference brought together a diverse group of 35 conferees representing a cross-section of academic scientists from secondary schools, two-year and four-year colleges, universities, industrial chemists, social scientists, humanists, mass media experts, and government and foundation representatives. All felt they were dealing with an important idea. Approaching their assignment in a spirit of self-examination and reevaluation of their own attitudes, the group moved on to plans for positive action which would result in proposals for funding by private or Federal agencies.

One conferee set the tone for the section of the conference which considered a new chemistry program for the general student by reminding the conferees that the general student has several options in relation to the chemistry, *including the option to study no chemistry at all.*

The group agreed that, in any program, a determined effort must be made to meet the student at the level of his own experience, interest, concerns, and problems. All conceded that perhaps Aristotle had a point when he observed that often the guest is at least as good a judge of the feast as the cook.

Keynote of any curricular program, all concurred, should be its flexibility. Miss ALLENE JOHNSON, a teacher in the New Jersey public school system drove home the point. She spoke movingly of how different her emphasis must be to interest her present urban students from that which captured the imagination of her former pupils in a rural Carolina setting.

The group carefully developed a set of criteria for a new program aimed at the general student and gradually moved to the conclusion that the heart of any program to satisfy all these criteria would consist of integrated modular units, of two types—motivational and conceptual.

The second section of the conference—that dealing with a mass-media campaign to enhance the understanding and appreciation by the decision-making public of the life-enriching role of chemistry, recommended the development of four broad activities:

1. Television programs, both full-length and brief 'spots', on subjects of national, regional, and local interest, prepared by professional TV writers from resource materials produced by scientists.
2. Resource papers available not only as the substantive bases for TV programs, but also for students, libraries, and for translation into popular form by the press.
3. Continuing education programs established at regional centers and designed to appear to public policy makers.
4. A permanent panel on the Public Understanding of Science within the Division of Chemical Education to implement and continuously evaluate the first three proposed actions.

But let me report in a little more detail the curriculum program since plans for it are much more advanced than for the mass media program. The objectives of the project are to promote public understanding of science as a human endeavor and to promote social responsibility on the part of scientists and science teachers. More specifically, the proposed project is designed to develop and gain acceptance for a realistic nationwide program in chemistry for the general students who constitute a majority in the high schools and two-year colleges of this nation. This will be a program which, above all, will lead students to a genuine understanding and appreciation of the spirit of science and its role in civilization. In short, we propose to develop, interpret, promote, and gain wide adoption for an introductory chemistry-based science program of integrated, modular units.

Those of you who are familiar with CHEMS and CBA will recognize that what I have stated about CAUSS represents a major operational and philosophical approach compared with CHEMS and CBA. CHEMS and CBA performed a major service to high school students who were science oriented and probably headed for careers in science. One result has been a noticeable improvement in the preparation of science-career-bound students entering college chemistry courses.

What was not accurately predicted was that the general students of today are not reached effectively by the same approach which worked so well with their science-oriented classmates. The conferees at the Colorado State University meeting concurred in a belief that interests, attitudes, and national priorities of the general students have shifted significantly in the decade since CHEMS and CBA were undertaken. A large percentage of the college-bound students who are not science oriented, as well as many if not most of the 50% of the high school students who do not attend college, are never exposed to a course in chemistry. Viewed only from the narrow goal of producing more scientific experts this fact is not alarming, but from the standpoint of supplying a scientifically informed and literate citizenry, it is deeply disturbing.

Our challenge, as scientists, is to go beyond teaching a great deal of science to a few students and try to teach some science to the much larger number who are not attracted by present courses. Somehow, we must find a meeting place where those present realities of our future, *students and science*, may be brought together more happily.

This meeting place, the conferees concurred, should be more nearly at the point of the student's interests, concerns, needs, problems, and wants. We must teach chemistry from a more humane standpoint, not just as an internally consistent disembodied intellectual exercise, divorced from the reality of life. We must place it firmly in its social setting, and design our program always keeping in mind the kind of problems involving science which a citizen is likely to face. We have done well in presenting the experimental dimension and the conceptual dimension of science; the time has come to add the third dimension—the societal and humanistic.

The building of a total program for the general student in the secondary schools and two-year colleges will require:

1. The development of the modular units, complete with all written experimental and audio-visual study materials and teacher guides, and supplemental kits and packets to enhance group work and encourage independent study.
2. Constant testing and evaluation of all materials from cognitive, affective and psychomotor standpoints, followed by revising, rewriting, and retesting.
3. Ever-broadening teacher training, not alone in the use of the materials but in molding the attitudes and styles which make for a wholesome learning-teaching situation in a program of this type.
4. Continuous communication with teachers' groups, and teachers and administrators across the nation, informing them of the philosophy, goals, progress, available materials, teacher opportunities, and practical methods for the introduction of the new program.

The project will be organized on the basis of approximately six regional centers. Each center will have a Director. One of the most convincing confirmations of the validity of the flexible modular approach in teaching science to the general student is the fact that leading scientist and science educators at several of the nation's foremost sites for research and experi-

mentation in education have arrived independently at the identical concept. Some are already underway in working with teachers in developing and testing modules on a limited, local basis. The regional centers will be located largely at such institutions, perhaps four at universities for work with secondary schools, and two at two-year colleges. Logical candidates for positions as Regional Directors are the men and women who already have initiated local projects. As a rule they have close and effective working relationships with a cluster of area high schools and with colleagues who are expert educational psychologists and curriculum specialists.

Of vital importance to the soundness of the program will be disinterested evaluation of materials being produced and a careful objective and perceptive assessment of student reaction.

Only after exhaustive trial and testing will materials be promoted and distributed. In time we expect the program to become self-sustaining. As the modular approach in the course for the general student is endorsed by teacher training institutions and integrated into their curricula, student teachers will become skilled in the use of modules and will rely upon them. We can readily foresee that organizations of science teachers will establish continuing committees to work out new motivational modules as society's problems and resources change, and to bring conceptual modules up to date as science advances. This project should provide a model for further curriculum development and revision in chemistry at the college and university level, as well as in other academic disciplines, and could result in the development of broad interdisciplinary programs.

W. B. Cook

## **THE CASE OF INDIA**

In discussing a topic of this kind with respect to developing countries like India, I cannot avoid comparing the two worlds in science and technology. We have, on one hand, the advanced countries where science or more correctly the byproducts of science, namely technology, rules supreme in society and there is growing indifference and animosity towards science. In the developing countries, on the other hand, science and technology are yet to make their impact: the common citizen is yet to get his two square meals a day and he looks at the world of science with awe and respect. I do not know how long this will last, but it is pertinent to look at the status of our present day civilization in the different parts of the world while drawing up plans for science education. This is particularly required of chemical educators, since we chemists generally believe chemistry has much to offer towards the betterment of man.

### **The Role of Science Education in Developing Countries like India**

The driving forces of societies in advanced countries have been marked with a scientific orientation. The adventure of scientific and technological research appears as the main access to the future in which ambitions shown by a nation are expressed. In order to build a future on the progress of science and technology, large-scale efforts are being made in science education, especially in illustrating their implications to society. In spite of these efforts there is increasing evidence of dissatisfaction amongst students and the general public with regard to science. There seems to be a demonstrable shift of interest in students away from science. Students express great dissatisfaction



with what is being taught and how it is being taught. People are not sure of the future that science may provide them. Philosophical questions are being raised about happiness and contentment even in countries where science has already benefitted man.

The problems that concern the developing nations are of a different kind. Every developing nation would very much like to have a scientific orientation to its society. The common man has high expectations from science, but his old world traditions still dominate his attitudes. He will continue to view science with some reservations unless he can directly experience its impact. Even if he were to accept science, he is still a long way from understanding the processes that make science work for man. Developing countries like India have had nothing like the industrial revolution in the West. Some changes are, however, slowly taking place without such a revolution. The common man finds the fast pace of an industrialized society to be very different from the pace that he or his forefathers were used to. Overriding all these are the cultural problems. Unless the technological revolution takes place simultaneously with a social revolution in a developing country, we may be dealing with an explosive situation which could have political and other overtones.

The two important factors responsible for technological revolution are the adoption of the scientific method or attitude and the democratic ideal which accepts that both the society and the technological revolution stand for the common good of all men. Unless we have a large number of persons with well-trained and highly competent minds, it is not possible to deal with the complex problems facing India. Even more important is the need basically to change the attitudes of the majority of the people in a country, where the past coexists to a large measure with a small contribution from the present. We need to establish an organic connection between the past and the present and bring about a change in the minds of men where they do not find any contradiction in having scientific attitude to obtain a better life for themselves and others. This problem becomes acute because of the overwhelming population (which will reach a billion or more by 2000 AD). How can we plan a massive education system which will be able to bring a social revolution of which science and technology are a part. It is in this context that chemists have much to contribute to society, both in education and industrialization.

The number of colleges and universities in India has increased enormously since India became independent in 1947. Before independence, there were 20 universities. Now there are nearly 80. For a person of college age, the chance of entering college is nearly 10 times higher than it was at the time of independence. Although we are spending a considerable amount of money on education, the actual percentage of the gross national product spent on education is low compared to the other countries. The quality of education, especially in science, undoubtedly is not high. The performance of educated people has been poor. One of the limitations for effectively carrying out national programmes in the country is because education is a state subject.

In a society where poverty is extreme, resources limited, even the marginal gains in education, communication, and health have produced a tremendous increase in the expectations of our people. Unless gains are visible, the rising expectations can sweep away the middle-class intellectuals completely. There is an urgent necessity for the survival of intellectuals and educational institutions. In order to do this, we have first to get rid of the discontent amongst the educated people, particularly amongst students and teachers.

Our educational institutions in India are poorly equipped both in terms of

hardware and in terms of manpower. The curricula are generally outdated; we seem to teach little of modern science or its cultural aspects. The teachers are poorly paid and have no ambitions, professionally or otherwise. The students are dissatisfied because they do not see any future for themselves; they see large-scale unemployment and substandard living of most of the educated people. The degrees they receive have no relation to the real problems. It seems to me that we are actually sowing seeds of dissatisfaction by producing college graduates (even though in small numbers compared to the population); they would have been happier if we had not raised their hopes by giving college education. One of our main problems now is how to produce the future leaders and managers of our society with the existing framework where poverty and unemployment rule supreme.

One of the important objectives of science education in India should be to train science-oriented managers of humanity besides skilled technicians, trained teachers, and others responsible for technology transfer. These managers will be responsible for the dissemination of knowledge in the villages of the country in areas like fertilizers, pesticides, transportation, pollution, water resources, meteorology, electric supply, television and radio communication, foods and drugs, contraceptives, *etc.* Many of these areas involve direct contributions from chemistry graduates.

Let me briefly say something about the frontiers of science and technology in a developing country like India. Space research is fashionable in an advanced country. It is the last thing that a developing country needs. What it may require, however, would be space satellites which can be used for weather forecast and mass communication in a large country like India. It will be a tremendous exercise for a poor country to plan and execute programmes of this sort on its own. Let me mention a typical research area specific to India which is important, but has been ignored. India has the richest source of titanium (and iron) ores and, in principle, India can be a major supplier of these metals in the world. Why it is that we have not worked out schemes for the exploitation of the titanium ores as a priority problem is difficult to understand. Such projects will enable research scientists and engineers to work in frontier areas which are defined in terms of local needs. Many chemists tell me that they are prepared to take up applied research projects if they are assigned such work. Who is to assign such work and who is to determine the priorities for the country is a problem that has to be solved by the planners, the government, and the political forces. Undoubtedly chemists have to be directly involved in such planning.

### **Programme for the Public**

From the above discussion it is clear that there is need for change in the attitudes of the students, the teachers, the policy makers, and the public. No programme in science education can be successful unless there is understanding on the part of the public. Scientists, in particular chemists, have to establish their credentials with the public and earn their respect through conscious efforts. One of the ways of doing this would be through good educational programmes in primary and secondary schools (as well as in colleges). Since chemistry reaches most homes in India through the children, it is important to see that the right kind of chemistry is taught to non-chemists and nonscientists at all levels of education. The public should become aware of the nature of science and the importance of chemistry through school curricula and more so through popular articles in newspapers



and magazines as well as television and radio programmes. In developing countries like India where the public is impressionable, such publicity for science will undoubtedly meet with success. The public should become aware that most of man's pressing problems like food, clothing, population, pollution, drugs, and so on will be solved, if at all, through chemistry. While this may look superfluous in an advanced society, this kind of education of the public will have both moral and material benefits in developing countries. Further, it is indeed possible that the common man in a poor country will develop a scientific attitude over a period of time through the various mass communication media. If he indeed does so, he will be better prepared to benefit meaningfully from the technological advancements and also to contribute to the economic development of the country. Out of all this, science may indeed go up in the value scale of our society, something that should happen in advanced countries as well.

Popularization of science (chemistry) through mass media has hardly begun in India. In another two years, we should be sending up a satellite which will enable us in due course to reach the homes in the thousands of villages. We are yet to plan the software for the television programmes and the chemists have a big responsibility in producing effective programmes. Such programmes may, however, have to be in all the 14 languages of the country if most citizens are to benefit. I feel that organizations like IUPAC and UNESCO should actively involve themselves in establishing centres for popularization of chemistry through mass communication media in developing countries.

In developing countries like India, the development of chemical industry has not been very satisfactory. Unless professional chemists participate directly in initiating plans for various chemical industries, the economy cannot multiply. Chemists should prepare a ten-year profile for the chemical industry and then see how they can assist the industries by providing technical advice and by training the proper kind of student. The training of entrepreneurs in chemical industry must be seriously attempted in universities.

Chemists should get involved in national economic planning, particularly in developing countries. Unfortunately, fewer chemists have done this than is desirable. There is great need today for spokesmen for science in general, and chemistry in particular, in the government.

## Students

The millions of students in India badly need attention. It is high time that careful thought was given to the presentation of chemistry as an important and humane subject. So many important components of a sound chemical education are lacking in India that it would be difficult to list any one or two priority requirements in isolation. Every component of the Indian educational system needs to be lubricated or discarded. Of the various science subjects, chemistry has been treated particularly badly by everyone concerned. It has the bad reputation of requiring (from the students) the ability to regurgitate and tolerance for bad odour.

I will briefly list some of the important needs of students in our educational system: (1) decently equipped laboratories and libraries in schools and colleges; (2) ready availability of indigenous books and some important journals; (3) trained and motivated teachers; (4) modernization of curricula where laboratory instruction and lecture demonstrations become interesting; (5) an examination system which would demand from the students more than



mere ability to pass the final examination at the end of the year; (6) training of chemical technicians who are likely to be more useful than many of the average B.Sc. degree holders.

It is high time that we did something for chemical education in India where the students still do not have any apathy for science itself. I hope that it will still be possible for us to appeal to the imagination and the nationalism of our students.

### Teachers

Like the students, the teachers of India have long been ignored. As I mentioned earlier, teachers do not enjoy the confidence or the respect of the society. An average science teacher is ill-trained and poorly motivated. He is paid poorly and has little or no idealism. Even if he has the interest, he does not have at his disposal the essential educational materials like books and journals. For him, the teacher's job is like any other job and he sees nothing special in it. Although he realises that chemistry has much to contribute to the nation's development, he has some misgiving in emphasizing this to his students since he feels that either he or his students may never participate creatively in any important endeavours. Along with curricular reforms, we need to give increased attention to in-service training of teachers, not merely by giving short-term courses, but also by giving them opportunities to come into contact with better institutions and active teachers and research workers.

Although some important programmes for the improvement of chemical education have been initiated in India through programmes of the National Council for Education Research and Training, National Council for Science Education, and University Grants Committee (particularly after the Indo-US Conference on Chemical Education in 1969), the progress we have made is far from sufficient. The scientific awareness of the community as well as the economic development of the country will significantly depend on the chemical education programmes. It is highly desirable for international organizations like IUPAC to take direct interest in such programmes by providing assistance in establishing an active chemical education centre with an international reputation in India. If such centres cannot be established in every country, we could at least think of one or two international schools of chemistry (similar to the International School of Theoretical Physics in Trieste) where active teachers could spend some time periodically. If it is difficult to establish such international schools due to financial limitations, we could perhaps have groups of distinguished teachers giving intensive short-term courses (6-8 weeks) in the various areas relevant to chemical education in different parts of the world.

Practice of chemistry (particularly at the research level) is becoming more and more sophisticated and it is impossible for most colleges and universities to obtain the instruments and know-how in some of the newer areas like photoelectron spectroscopy, ESCA, high pressure research, laser Raman, some special aspects of NMR and Mössbauer spectroscopy, *etc.* It should be possible to provide some assistance to active teachers (and their students) in obtaining services of such sophisticated instruments through special centres. The centres would have to be given some financial support for providing such services; since these centres would already be active in the field, the support would only be marginal.

C. N. R. RAO

## IN UNITED KINGDOM AND BRITISH COMMONWEALTH

The object of this brief talk is to try to summarize what is happening in UK and in the British Commonwealth to inform citizens about science in general and chemistry in particular. Our remarks are presented under three headings: school, university level, and adult education. However, we confess at the outset that overall we feel depressed at how little is being done. This situation is perhaps high-lighted by the fact that at the present moment the British Association for the Advancement of Science is nearly bankrupt and is appealing for the relatively small sum of £50,000 per annum to do its job of informing citizens in UK of what is happening in science. We seem to live in a crazy world when we can find hundreds of millions of pounds for projects such as the Concorde supersonic aircraft—which may never be commercially viable—whilst important educational organizations like the British Association may founder because of a lack of Government support.

Although we may blame uninformed and uninterested politicians or the top echelon of the Civil Service for the failure to provide facilities for adult education in science in general and chemistry in particular, we as scientists must accept part of the blame for the present situation. Not only must we be prepared to interpret science so that it can be understood by the average citizen, we must also use language which will guarantee that citizens are convinced and not confused. As pointed out by Sir EDWARD APPLETON in regard to the first of these, 'If you cannot explain your work in simple language you have not got to the bottom of it yourself.' Dr. ARCHIE CLOW has given some good examples of the kind of obscure English which further confuses the citizen. Who for instance would guess that the phrase 'There may be a protracted hiatus in providing potential at the consumers' terminals' means that 'there may be an electric power shortage in the near future'.

With this personal outburst out of the way, let us discuss first what is happening at the three levels. We start here because the child is father to the man and the best way of ensuring that he will be a chemically concerned citizen is to start by helping him to be a chemically educated child.

### School Level

Most people are familiar with the fact that, in the same way that USA produced, in the post-Sputnik era, school programmes on biology, physics, and chemistry to bring these subjects up to date, so the Nuffield Foundation and the Scottish Education Department in UK sponsored programmes at various levels for secondary and primary school. First, they produced the so-called Ordinary Level programme for children between the ages of eleven and sixteen. In practice, this has been of greatest value for the top 30-40% of children and especially for those aiming to continue with science in some form or other, be it medicine, engineering, or one of the pure sciences. Following this programme, the Advanced Level Course was produced. This is a two-year programme, catering for students up to the age of eighteen or nineteen, and is equivalent to the end of first year in an Australian or American university. Perhaps of greater interest to us, however, is a new programme called Nuffield Secondary Science Project. This tries to present science as part of a general education for school-children and is specifically intended to prepare them to become scientifically informed citizens. Of course, the assumption is that students will remember, after leaving school, the kind of

things they learned in this programme and will apply them to everyday life. This assumption may not be valid unless continued contact with science at the adult level is effected.

Overall, the direct and indirect results of the Nuffield Project appear to us to be:

1. The syllabuses and examinations of all of the Examining Boards in Britain have been brought up to date.
2. The subjects of chemistry, physics, and biology are now taught in many schools with a greater concern for the spirit of enquiry, the use of the experimental approach, the relevance of the subject to everyday life and the intellectual stimulus that they provide for the child.
3. It became abundantly clear from the outset that a retraining of teachers was frequently essential, and although this has not gone as far as we would like, we believe that the situation is now much better than it was ten years ago.
4. A considerable number of new experiments have been developed for use at the school level, replacing many of the old-fashioned and irrelevant ones—such as the preparation of oxygen from mercuric oxide. Film loops, data books, teachers' guides, and other aids have been published, all of which enhanced the status of science in the eyes of the pupils and teachers. The immediate impact of the Nuffield Project, however, for the general adult public is small and the effect will not be evident for some years until the present youngsters reach maturity.

### University Level

English universities have long been geared to specialization and indeed many of them abandoned years ago all courses other than special Honours Degrees. The situation arises from the fact that in Britain good secondary schools normally teach chemistry, physics, mathematics, and biology to a level at least equivalent to that at the end of the first year in universities of the British Commonwealth overseas and on the North American Continent. This has meant that a good deal of preselection occurs at school; it has been assumed in the past, wrongly we believe, that most students know exactly what they want to do so far as study for a career is concerned, when they enter the university. Three factors are changing this.

*First*, there is a natural desire on the part of the public for a higher percentage of school leavers to go to university and to receive an education in this type of environment. This means that the *average* ability of students coming is not as high as it was before and many of these want to study for a general degree. *Secondly*, there has been a willingness on the part of a few universities to recognize that more and more students in the sciences wish to be educated *through* their discipline, rather than *for* a job in that particular subject. This means that there should be more courses which can be roughly summed up as 'science for liberal studies'. (A course along these lines is presented by Prof. JEVONS in University of Manchester.) The *third* factor which has been influential is that most children today have been reared in an environment in Western Society, where the 1930s concept of unemployment, social insecurity, and the need to fight to get a job have largely disappeared, hence speculation is less attractive to them. (Cynics in UK and elsewhere would comment on this point that this is purely a temporary phenomenon, and that our inability in the Western world to control the economies is



rapidly leading us back to the 1931 situation.) It must be said, however, that chemistry for the informed citizen of the future is still not a widely taught subject in universities. Frequently, the courses are labelled as 'ancillary' and are almost immediately damned for that reason. Secondly, there is a widespread view that the top University chemistry lecturers teach the Honours students and the lesser mortals teach General courses. This is deplorable, but it arises out of university specialization. Until the length of university courses is increased to four years and the study of a science subject by nonscientists becomes a necessary part of the degree—as it is for instance in University of Keele—we are not optimistic that the prestige of chemistry for nonscientists will be greatly improved.

### Adult Education

This gives us more grounds for hope. Before, during, and immediately after the war the Workers' Educational Association (WEA), which has long enjoyed a very high reputation in Britain and in Australia, provided a considerable number of adult education courses in science for the concerned citizen. These tended to be very local in character and seemed to be less effective in the very big cities like London, partly because travel to and from work takes up so much of the time that a person might otherwise be able to devote to this kind of activity.

The British Association for the Advancement of Science (BA) has for over a century done a first-class job, but it is passing through a traumatic period when it is trying to come to grips with a changing situation. Gone is the time when people went along in a leisurely way to the Annual Meeting of the Association in September and heard, for example, Sir WILLIAM RAMSAY announcing the discovery of the noble gases. People are far busier and the cost of providing and attending the meetings has greatly increased. The effect of the British Association upon the community as a whole today is, I think, a peripheral one at least so far as the meetings are concerned. Of greater value is the press and radio/television coverage which the BA enjoys. Also the BAYS Scheme (British Association for Young Scientists) has developed branches in many parts of the country and these have done a lot to stimulate youngsters through Science Fairs and meetings and it is hoped that this interest is carried on after the school level. The daily and weekly press give a very limited coverage of science except where it is spectacular. The so-called quality paper *The Times* has a daily science article but most other papers provide a very poor cover of scientific developments. The weekly *New Scientist* does a good job for the limited—and already converted—audience to which it is addressed.

Undoubtedly the most important media in UK today for explaining to the intelligent layman what is happening in chemistry are the radio and television services of the British Broadcasting Corporation (BBC) and the Independent Television services. There have been some popular programmes such as the Science Brains Trust edited by Dr. ARCHIE CLOW; programmes such as *Horizon*, *Tomorrow's World*, and other documentaries have done much to familiarize the average man in the street with what is happening. Unfortunately, there is all too often the inevitable 'gimmickry' on the part of the producer who is frequently more interested in presenting some exciting new development, for example, heart transplants, than in giving an overall picture of the role of chemistry in particular and science in general in the community. We need many more programmes on topics such as 'fuels'—the various

kinds, the cost per therm and the need for a balance between the use of local and imported fuels. The tragedy is that we don't think we have yet come to terms with the enormous potentiality of television and radio. Excellent use has been made of it by Prof. GEORGE PORTER, Director of the Royal Institution; this organization has, in a modest way with its evening programmes, long tried to get science across to those members of the public who are prepared to turn up at 9.00 p.m. in a dinner jacket in Albemarle Street for the Friday evening Discourse. Prof. PORTER's Christmas lectures for children, especially the superb series on entropy—and those of the late Sir LAURENCE BRAGG—have helped enormously to widen the influence of the Royal Institution and to make people appreciate a lot more about science.

Basically, the main problem in UK is that many of our politicians and the people in the top echelon of the Civil Service are educated in the classics or in the arts generally, with very little knowledge of science. Ignorance itself is not a crime, but the tragedy is that far too many of those in these high offices give the impression that they are proud of their ignorance. It is a peculiar world in which scientists, rightly, feel ashamed if they do not know the meaning of the Latin expression, *non sequitur*, or the history of the development of England in, say, the nineteenth century, but many of their arts colleagues know little of the scientific and technological facts which have affected the development of society during the past twenty years, and are fairly happy to remain in this state. Changes will come about only when a broader general education up to the stage when children leave school is insisted upon, and when it is generally appreciated that one of the subjects which needs to be taught to all people at school is—science—right up to the time when they leave school.

We have made little reference so far to the Dominions. The position in New Zealand is similar to that in UK, except that the excellent facilities of the Royal Institution are missing; much the same situation holds true for Australia. It is fair to say that there is a willingness on the part of the Civil Servants and politicians who *want* to inform the average citizen about science, but the job done by broadcasting and television in Australia is very much worse than in UK. Overall, the unwritten policy seems to be that you put on commercial television that which is likely to sell somebody's latest detergent and if it comes to more sophisticated subjects such as space travel the organizers tend to work on the principle 'if I can't convince them I'll confuse them'. The National (State) Broadcasting system tends to try to compete at this level with a consequent lowering of standard.

There are a few bright spots on the horizon, however. Australia has developed a modest University of the Air and in UK the vigorous Open University, which involves the use of the BBC channels for several hours per week, is enabling many people to benefit even though they are not formal course students.

We believe that the future lies in the effective use of television and radio, with time deliberately purchased by the State for programmes which are both intelligible and sophisticated enough to appeal to bright, but uninformed, minds.

D. G. CHISMAN  
R. S. NYHOLM

# IUPAC PUBLICATIONS

1966-1970

A compilation of IUPAC Publications last appeared in the *Information Bulletin* in February 1967 (No. 28). Some 1966 references were then included. The present listing attempts to cover everything issued subsequently up to the end of 1970.

The IUPAC Secretariat would be pleased to receive notification of any omissions from the new listing, especially of translations completed or in process of being prepared of IUPAC nomenclature recommendations.

## 1966

### Pure and Applied Chemistry\*

Vol. 12, Nos. 1-4: Special Lectures from International Symposium on Macromolecular Chemistry, Prague (Czechoslovakia), August-September 1965  
Commission on Macromolecules: Report on Nomenclature dealing with Steric Regularity in High Polymers

Vol. 13, Nos. 1-2: Special Lectures from International Symposium on Organosilicon Chemistry, Prague (Czechoslovakia), September 1965

Vol. 13, No. 3: Plenary Lectures from International Symposium on Properties and Applications of Low-temperature Plasma, Moscow (USSR), July 1965  
Section on Fermentation Industries: Worldwide Survey of Fermentation Industries 1963

Commission on Electroanalytical Chemistry: Preparation of Anhydrous Ethylenediamine; Purification of Acetonitrile and Tests for Impurities

Vol. 13, No. 4: Plenary Lectures from Conference on Application of Physicochemical Methods in Chemical Analysis, Budapest (Hungary), April 1966

### Information Bulletin†

No. 25, February 1966

[IUPAC-IUB Commission on Biochemical Nomenclature: Trivial Names of Miscellaneous Compounds of Importance in Biochemistry (tentative); Nomenclature of Quinones with Isoprenoid Side-chains (tentative); Abbreviated Designation of Amino Acid Derivatives and Polypeptides (tentative)]

Commission française de Nomenclature: Nomenclature des Molécules organiques marquées

Section on Plastics and High Polymers: Recommendations for Abbreviations of Terms relating to Plastics and Elastomers (tentative)]

\*Official journal of IUPAC and supplements to it are available from Butterworth & Co. (Publishers) Ltd., 88 Kingsway, London WC2B 6AB, UK.

Much of the important material which appears in the journal is published shortly afterwards in book form.

†Available from IUPAC Secretariat.



No. 26, August 1966

[IUPAC-IUB Commission on Biochemical Nomenclature: Rules for Nomenclature of Corrinoids (tentative)]

Commission on Equilibrium Data: Recommended Symbols for Solution Equilibria (tentative)

Commission on Analytical Nomenclature: Recommended Terminology of Liquid-Liquid Extraction (tentative); Recommended Terminology for Automation, *etc.* (tentative); Recommendations for Presentation of Results of Chemical Analysis (tentative); Recommended Nomenclature of Titrimetric Analysis (tentative)

Commission on Electroanalytical Chemistry: Proposal for Practical Measurement of pH in Amphiprotic and Mixed Solvents (tentative); Recommended Classification and Nomenclature of Electroanalytical Methods (tentative)]

No. 27, December 1966

[IUPAC-IUB Commission on Biochemical Nomenclature: Rules for Naming Synthetic Modifications of Natural Peptides (tentative)]

### Miscellaneous

Nomenclature of Organic Chemistry: Sections A & B (Second Edition)\*  
(Section A: Hydrocarbons

Section B: Fundamental Heterocyclic Systems

Rules for Nomenclature of Steroids)

Règles de Nomenclature pour la Chimie organique: Sections A-B-C (available from Société chimique de France, 250 rue Saint-Jacques, F-75 Paris 5<sup>e</sup>, France)

Multilingual Dictionary of Important Terms in Molecular Spectroscopy—in English, French, German, Japanese, and Russian (available from National Research Council of Canada, Ottawa, Ontario, Canada)

Bulletin of Thermodynamics and Thermochemistry—No. 9, May 1966 (available from Publications Distribution Service, University of Michigan, 615 East University Avenue, Ann Arbor, Michigan 48106, USA)

†Bibliography on High Temperature Chemistry and Physics of Gases and Plasmas—No. 18, March 1966

No. 19, June 1966

No. 20, September 1966

No. 21, December 1966

†Bibliography on High Temperature Chemistry and Physics of Materials in the Condensed State—No. 1, January-March 1966

No. 2, April-June 1966

No. 3, July-September 1966

No. 4, October-December 1966

## 1967

### Pure and Applied Chemistry

Vol. 14, No. 1: Main Lectures from IVth International Symposium on Chemistry of Natural Products, Stockholm (Sweden), June-July 1966

\*Supplement to *Pure and Applied Chemistry*.

†Available from National Bureau of Standards, US Department of Commerce, Washington, DC 20234, USA.

- Vol. 14, No. 2: Main Lectures from Symposium on Carotenoids other than Vitamin A, Trondheim (Norway), June 1966
- Vol. 14, Nos. 3-4: Lectures presented at International Symposium on Dissolving Pulps, Helsinki (Finland), May 1966
- Vol. 15, No. 1: Plenary Lectures from International Symposium on Free Radicals in Solution, Ann Arbor, Michigan (USA), August 1966
- Vol. 15, No. 2: Plenary Lectures from International Congress of Polarography, Kyoto (Japan), September 1966
- Vol. 15, Nos. 3-4: General Lectures from International Symposium on Macromolecular Chemistry, Tokyo and Kyoto (Japan), September-October 1966

### **Information Bulletin**

No. 28, February 1967

No. 29, July 1967

No. 30, October 1967

[IUPAC-IUB Commission on Biochemical Nomenclature: Nomenclature of Lipids (tentative); Abbreviated Nomenclature of Synthetic Polypeptides (Polymerized Amino Acids) (tentative)]

### **Comptes Rendus IUPAC Conferences**

Comptes Rendus XXIV Conference, Prague (Czechoslovakia), September 1967—now out of print

### **Miscellaneous**

Bulletin of Thermodynamics and Thermochemistry—No. 10, March 1967

Bibliography on High Temperature Chemistry and Physics of Gases and Plasmas—No. 22, March 1967

No. 23, June 1967

No. 24, September 1967

No. 25, December 1967

Bibliography on High Temperature Chemistry and Physics of Materials in the Condensed State—No. 1, January-March 1967

No. 2, April-June 1967

No. 3, July-September 1967

No. 4, October-December 1967

Quantities and Units in Clinical Chemistry including Recommendation 1966 (available from Munksgaard, Copenhagen, Denmark)

## **1968**

### **Pure and Applied Chemistry**

Vol. 16, No. 1: Plenary Lectures from IInd International Symposium on Photochemistry, Enschede (Netherlands), July 1967

Vol. 16, Nos. 2-3: Plenary and Main Lectures from International Symposium on Macromolecular Chemistry, Brussels and Louvain (Belgium), June 1967

Vol. 16, No. 4: The Classifying of High Polymers. A Report (in German) prepared for Section on Plastics and High Polymers (now Macromolecular Division) with Key Sections of the Report Translated into English

Vol. 17, No. 1: Plenary Lectures from Xth International Conference on Coordination Chemistry, Tokyo and Nikko (Japan), September 1967

Vol. 17, No. 2: Plenary Lectures from IIIrd International Symposium on Organometallic Chemistry, Munich (Germany), August-September 1967  
Section on Fermentation Industries: A Standardization of Methods for Determination of the Alcohol Content of Beverages and Distilled Potable Spirits

Vol. 17, Nos. 3-4: Plenary Lectures from Vth International Symposium on Chemistry of Natural Products, London (UK), July 1968

### Information Bulletin

No. 31, March 1968

[Committee on Teaching of Chemistry: In-service Training of Chemistry Teachers

Sub-Commission on Mycotoxins: Provisional IUPAC Method for Aflatoxin in Peanuts, Peanut Butter, and Peanut Meal: Collaborative Study of a Versatile Procedure for Assay of Aflatoxins in Peanut Products]

\*No. 32, August 1968

[Commission on Physicochemical Symbols, Terminology, and Units: Revised Version of 1959 Manual of Physicochemical Symbols and Terminology (tentative)

IUPAC-IUB Commission on Biochemical Nomenclature: A One-letter Notation for Amino Acid Sequences (tentative)

Commission on Nomenclature of Organic Chemistry and IUPAC-IUB Commission on Biochemical Nomenclature: Rules for Cyclitol Nomenclature (tentative)]

No. 33, December 1968

[Commission on Nomenclature of Organic Chemistry and IUPAC-IUB Commission on Biochemical Nomenclature: 1967 Revised Rules for Nomenclature of Steroids (tentative)

Commission on Nomenclature of Inorganic Chemistry: Nomenclature of Absolute Configurations concerned with Six-coordinated Complexes based on the Octahedron (tentative)]

### Miscellaneous

Experimental Thermodynamics: Vol. I—Calorimetry of Non-reacting Systems†

Handbook for the Chemist (Second Edition): Russian version of Nomenclature of Organic Chemistry, Sections A, B, C (available from Khimia Publications, Leningrad, USSR)

English-Spanish version of Important Terms in Molecular Spectroscopy (available from Instituto de Optica, Madrid 6, Spain)

Bulletin of Thermodynamics and Thermochemistry—No. 11, June 1968

Bibliography on High Temperature Chemistry and Physics of Gases and Plasmas—No. 26, March 1968

No. 27, June 1968

No. 28, September 1968

Bibliography of High Temperature Chemistry and Physics of Materials in the Condensed State—No. 1, January-March 1968

No. 2, April-June 1968

No. 3, July-September 1968

\*Now out of print.

†Supplement to *Pure and Applied Chemistry*.



- \*Bibliography on the High Temperature Chemistry and Physics of Materials  
—NBS Special Publication 315, October-December 1968
- A Collaborative Study of Polystyrene using Torsion Pendulum and Impact Methods [*J. Polymer Science Part C*, No. 16, 3845 (1968)]. A Report of the Working Party on Relationship of Performance Characteristics to Basic Parameters of Polymers
- Modern Chemistry in Industry. Proceedings of International Symposium, Eastbourne (UK), March 1968 (available from Society of Chemical Industry, 14 Belgrave Square, London SW 1, UK)
- Progress in Coordination Chemistry. Proceedings of XIth International Conference on Coordination Chemistry, Haifa and Jerusalem (Israel), September 1968 (available from Elsevier Publishing Co., Amsterdam, Netherlands)

## 1969

### Pure and Applied Chemistry

- Vol. 18, Nos. 1-2: Plenary Lectures from XXIst International Congress of Pure and Applied Chemistry, Prague (Czechoslovakia), September 1967
- Vol. 18, No. 3: General Lectures from IXth European Congress on Molecular Spectroscopy, Madrid (Spain), September 1967
- Commission on Electroanalytical Chemistry: Practical Measurement of pH in Amphiprotic and Mixed Solvents.
- Commission on Analytical Nomenclature: Recommended Nomenclature for Titrimetric Analysis; Recommendations for Presentation of Results of Chemical Analysis; Sodium Carbonate and Sulphamic Acid as Acid-Base Primary Standards
- Commission on Equilibrium Data: Recommended Symbols for Solution Equilibria
- Vol. 18, No. 4: Main Lectures from IInd Microsymposium 'Structure of Organic Solids', Prague (Czechoslovakia), September 1968
- Working Party on Relationship of Performance Characteristics to Basic Parameters of Polymers: A Collaborative Study of the Dynamic Mechanical and Impact Properties of Polyvinyl Chloride
- Commission on Atomic Weights: Atomic Weights of Elements 1967
- Section on Plastics and High Polymers: Recommendations for Abbreviations of Terms relating to Plastics and Elastomers
- Vol. 19, Nos. 1-2: Plenary Lectures from IInd International Symposium on Pharmaceutical Chemistry, Münster/Westf. (Germany), July 1968
- Section on Water, Sewage, and Industrial Wastes: A Guide to Flow Measurement and Sampling with Special Reference to Pulp and Paper Mill Waste Water Systems
- Vol. 19, Nos. 3-4: Plenary Lectures from IInd International Symposium on Organosilicon Chemistry, Bordeaux (France), July 1968
- Vol. 20, No. 1: Plenary Lectures from XIth International Conference on Coordination Chemistry, Jerusalem and Haifa (Israel), September 1968
- Vol. 20, No. 2: Commission on Electroanalytical Chemistry: Dissociation Constants of Inorganic Acids and Bases in Aqueous Solution
- Vol. 20, No. 3: Plenary Lectures from International Symposium on Valence Isomerization, Karlsruhe (Germany), September 1968

\*This publication replaced the two listed immediately above it.

- Plenary Lectures from IIIrd Microsymposium 'Distribution Analysis and Fractionation of Polymers', Prague (Czechoslovakia), September 1968  
 Working Party on Relationship of Performance Characteristics to Basic Parameters of Polymers: A Collaborative Investigation into the Rheology of Some Polystyrene and Polyethylene Melts  
 Vol. 20, No. 4: Plenary and Selected Session Lectures from IInd International Symposium on Carotenoids other than Vitamin A, Las Cruces, New Mexico (USA), May 1969

### Information Bulletin

- No. 34, April 1969  
 [Commission on Molecular Structure and Spectroscopy: Specifications for Measurement of Infrared Spectra for Documentation Purposes (tentative)  
 Commission on Nomenclature of Inorganic Chemistry: Nomenclature for Berthollides-Crystalline Phases of Variable Composition (tentative)]  
 No. 35, June 1969  
 [Commission on Nomenclature of Inorganic Chemistry: Iso-and Hetero-polyanions (tentative); Addendum to Rules on Coordination Compounds (tentative)  
 Commission on Nomenclature of Organic Chemistry: Nomenclature of Organic Chemistry. Section E—Fundamental Stereochemistry (tentative)]  
 No. 36, November 1969

### *Appendices on Tentative Nomenclature, Symbols, Units, and Standards*

- \*No. 1, December 1969: Nomenclature, Symbols, Units and Their Usage in Spectrochemical Analysis—I (Commission on Spectrochemical and Other Optical Procedures for Analysis)  
 \*No. 2, December 1969: Catalog of Physicochemical Standard Substances (Commission on Physicochemical Measurements and Standards)

### Miscellaneous

- †Report on the Work of the International Union of Pure and Applied Chemistry, 1957-1967: W. KLEMM  
 †Evaluation in Chemistry. Report of International Workshop, Ceylon, August 1968  
 ‡High Temperature Technology. Proceedings of IIIrd International Symposium, Asilomar, California (USA), September 1967  
 Analytical Methods for Use in Occupational Hygiene: Second Replacement-Addition Issue (formerly Methods for Determination of Toxic Substances in Air) [available from Butterworth & Co. (Publishers) Ltd.]  
 Bulletin of Thermodynamics and Thermochemistry—No. 12, June 1969  
 Bibliography on the High Temperature Chemistry and Physics of Materials—NBS Special Publication 315-1, January-March 1969  
 315-2, April-June 1969  
 315-3, July-September 1969  
 315-4, October-December 1969

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†Available from IUPAC Secretariat

‡Supplement to *Pure and Applied Chemistry*.

- Recovery of Pulping Chemicals. Proceedings of Symposium, Helsinki (Finland), May 1968 (available from Finnish Pulp and Paper Research Institute, Helsinki, Finland)
- Reactivity of Solids. Proceedings of VIth International Symposium, Schenectady, New York (USA), August 1968 (available from Wiley-Interscience, New York, USA)
- Fermentation Advances. Papers presented at IIIrd International Fermentation Symposium, New Brunswick, New Jersey (USA), September 1968 (available from Academic Press, New York, USA)

## **1970**

### **Pure and Applied Chemistry**

- Vol. 21, No. 1: Commission on Physicochemical Symbols, Terminology, and Units: Manual of Symbols and Terminology for Physicochemical Quantities and Units  
 Commission on Microchemical Techniques and Trace Analysis: A Study of Accuracy and Precision of Methods for Determination of Carbon and Hydrogen in Organic Compounds  
 Commission on Analytical Radiochemistry and Nuclear Materials: An Enquiry into Purity of Commercial Radiochemicals  
 Commission on Atomic Weights: Atomic Weights of Elements 1969  
 Commission on Analytical Nomenclature: Recommended Nomenclature for Liquid-Liquid Distribution  
 Commission on High Temperatures and Refractories: Cooperative Determination of Melting Point of Alumina
- Vol. 21, No. 2: Plenary Lectures from VIth International Symposium on Chemistry of Natural Products, Mexico City (Mexico), April 1969
- Vol. 21, No. 3: Plenary Lectures from International Symposium on Chemical Control of the Human Environment, Johannesburg (Republic of South Africa), July 1969
- Vol. 21, No. 4: Plenary Lectures from International Symposium on Analytical Chemistry, Birmingham (UK), July 1969
- Vol. 22, Nos. 1-2: Proceedings of International Symposium on University Chemical Education, Frascati, Rome (Italy), October 1969
- Vol. 22, Nos. 3-4: Proceedings of International Conference on Thermodynamics, Cardiff (UK), April 1970  
 Commission on Thermodynamics and Thermochemistry: Report on International Practical Temperature Scale of 1968
- Vol. 23, No. 1: Plenary Lectures from IInd International Atomic Absorption Spectroscopy Conference, Sheffield (UK), July 1969
- Vol. 23, Nos. 2-3: Main Lectures from IVth, Vth, and VIth Microsymposia on Macromolecules, Prague (Czechoslovakia), September 1969
- Vol. 23, No. 4: Plenary Lectures from IVth International Conference on Organometallic Chemistry, Bristol (UK), July-August 1969
- Vol. 24, No. 1: Congress Lectures from XXIIInd International Congress of Pure and Applied Chemistry, Sydney (Australia), August 1969
- Vol. 24, No. 2: Plenary Lectures from XIIth International Conference on Coordination Chemistry, Sydney (Australia), August 1969
- Vol. 24, No. 3: Plenary Lectures from IIIrd IUPAC Symposium on Photochemistry, St. Moritz (Switzerland), July 1970
- Vol. 24, No. 4: Plenary Lectures from Symposium on Chemical Aspects of Air Pollution, Cortina d'Ampezzo (Italy), July 1969



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No. 37, April 1970

[Section on Fermentation Industries: Evaluation of Active Dry Baker's Yeast. A Progress Report 1965-1968]

No. 38, November 1970

### *Appendices on Tentative Nomenclature, Symbols, Units, and Standards*

\*No. 3, January 1970: Manual of Definitions, Terminology, and Symbols in Colloid and Surface Chemistry (Commission on Colloid and Surface Chemistry)

\*No. 4, January 1970: Recommendations for Presentation of NMR Data for Publication in Chemical Journals (Commission on Molecular Structure and Spectroscopy)

\*No. 5, January 1970: Recommendations on Ion-exchange Nomenclature (Commission on Analytical Nomenclature)

\*No. 6, September 1970: Nomenclature for Vitamins B<sub>6</sub> and Related Compounds (IUPAC-IUB Commission on Biochemical Nomenclature)

\*No. 7, September 1970: Carbohydrate Nomenclature—I (Commission on Nomenclature of Organic Chemistry and IUPAC-IUB Commission on Biochemical Nomenclature)

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†Metal-Ammonia Solutions. Proceedings of International Conference on Nature of Metal-Ammonia Solutions (Colloque Weyl II), Ithaca, New York (USA), June 1969

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‡Vol. 14, No. 2: April-June 1970

‡Vol. 14, No. 3: July-September 1970

‡Vol. 14, No. 4: October-December 1970

\*Now out of print.

†Supplement to *Pure and Applied Chemistry*.

‡Available from Dr. M. G. HOCKING, Imperial College of Science and Technology, London SW 7, UK.

## **REPORTS OF IUPAC-SPONSORED SYMPOSIA**

### **INTERNATIONAL SYMPOSIUM ON IDENTIFICATION AND MEASUREMENT OF ENVIRONMENTAL POLLUTANTS**

**Ottawa, 14-17 June 1971**

The technical program comprising the Symposium featured 80 invited experts from around the world who presented papers on the most recent developments from areas of their specialization, covering a wide range of topics including pollutants and indicators of pollution in air, water, soil, and food. The meeting was held under the sponsorship of IUPAC, Association of Official Analytical Chemists, Chemical Institute of Canada, Agricultural Institute of Canada, and National Research Council of Canada. Three special plenary talks were presented at the meeting: Dr. M. W. HOLDGATE (Department of the Environment, London) spoke on 'The Need for Environmental Monitoring'; the topic of the talk by Mr. W. B. FOSTER (Environmental Protection Agency, Washington) was entitled 'Environmental Problems for the 70s'; the Honorable JACK DAVIS (Minister, Department of the Environment, Canada) presented his address on 'Pollution and Our Environment'.

An edited draft of each paper, including an abstract in English and French, together with the written comments and views of members of the audience, is contained in the published Proceedings of the Symposium. These papers contain a wealth of new material on pollutants written specially from the viewpoint of their identification and measurement and as such represent a significant contribution to the scientific literature.

The Symposium was highly successful in stimulating new ideas among the approximately 850 participants at the meeting. This stimulation can be broadened and extended through widespread distribution and further study of these important presentations.

The cost of the hard-cover Proceedings is \$35.00 Canadian funds. To obtain a copy, contact Mr. M. K. WARD, Executive Secretary ISIMEP, c/o National Research Council of Canada, Ottawa K1A 0R6, Canada.

I. HOFFMAN

### **INTERNATIONAL MEETING ON BORON COMPOUNDS**

**Liblice, 21-25 June 1971**

IMEBORON was the first international meeting on the chemistry of boron compounds. It was sponsored by the Czechoslovak Academy of Sciences (CSAS) and IUPAC and organized by the Institute of Inorganic Syntheses of CSAS at the baroque Castle of Liblice near Prague. Some 62 participants from 9 countries took the opportunity to meet for discussion of new findings, ideas, and trends in this growing branch of chemistry. The active participants were made up as follows: Czechoslovakia 18, USA 17, USSR 13, German Federal Republic 5, UK 4, Sweden 2, German Democratic Republic 1, Bulgaria 1, Switzerland 1. Six invited main lectures and 31 short communications were presented (37 abstracts of short communications were submitted).

The invited lectures were presented by the foremost scientists from this field and they will be published in *Pure and Applied Chemistry*. Almost the whole area of chemistry of boron-hydride derivatives was covered.

Prof. W. N. LIPSCOMB (USA) discussed his new approach to the understanding of the true nature of bonds in boron hydrides and showed that a modern computation technique enables one to distinguish between even such small differences as occur in the 'open' and 'central' three center bond and clearly demonstrated, that the former does not play as important a role as was previously suggested. This lecture was a further example of the outstanding contribution of Prof. LIPSCOMB not only to the first reasonable theory of boron compounds, but also to the understanding of chemical bonds in general.

Prof. L. I. ZAKHARKIN (USSR) reviewed recent developments in the chemistry of icosahedral carboranes. Special attention was paid to rearrangements of the skeleton caused either by heating or by addition of two electrons to the carborane framework. This lecture, presented in Russian, was a very good summary of the contribution of the Soviet school to the chemistry of these most popular and unique compounds.

Dr. E. L. MUETTERTIES (USA) reviewed the very new and rather wide field of nido-metallo borane compounds, an outstanding contribution to the chemistry of covalent complexes in general. This lecture represented a further milestone in the road Dr. MUETTERTIES and his associates are building from the beginning of the modern chemistry of boron hydrides.

Prof. H. C. BROWN (USA) presented a cross-section of his recent work concerning cyclic hydroboration of dienes. This contribution further extends the scope of hydroboration, a method which has changed the thinking of organic chemists more than any other in the last 20 years.

Prof. M. F. HAWTHORNE (USA), creator of the chemistry of sandwich-type closo-metallo borane compounds, presented his most recent achievements in the field of polynuclear metallo boranes and the outlook for the nearest future of these molecules. A new principle of insertion reactions, leading to an extension of the closed frameworks, was revealed and its utility was especially demonstrated in the extension of the icosahedron by the insertion of one metal atom. This achievement demonstrated for the first time that the icosahedron is not necessarily the largest possible polyhedron as was previously anticipated.

Dr. R. E. WILLIAMS (USA) briefly reviewed recent developments in carborane-siloxane polymers, their outstanding practical properties and possible uses as temperature-resistant rubbery materials. In more detail, especially materials containing the smaller than icosahedral carboranes were discussed, a field which he has opened up in recent years.

Short communications arranged into thematically related groups, such as boranes, metallo boranes, carboranes, hydroboration, and applications of boron compounds, completed the scientific programme. The first IME-BORON Conference was a success, both scientifically and socially, and participants agreed that it should be only the initial one of a continuing series. The next will take place in 1974 and thereafter others should follow each even year.

J. PLEŠEK  
B. ŠTIBR



# INTERNATIONAL CONFERENCE ON CHEMICAL TRANSFORMATIONS OF POLYMERS

Bratislava, 22-24 June 1971

This was the third scientific gathering of the kind, following those held in 1963 and 1968. It was realized under the auspices of IUPAC with the Polymer Institute of the Slovak Academy of Sciences acting as organizer in cooperation with the Department of Chemical Technology of the Slovak Technical University together with other interested Slovak institutions. This international scientific event was attended by 230 research scientists from 18 countries with more than half of them coming from abroad. Of the Conference participants a relatively high number were personalities of international reputation as well as authorities in this scientific field.

The Conference was solemnly opened with addresses by Prof. K. ŠIŠKA (President of the Slovak Academy of Sciences), Prof. A. BLAZEJ (Rector of the Slovak Technical University), and Prof. O. WICHTERLE (Chairman of the IUPAC Macromolecular Division).

The scientific programme of the Conference consisted of 1 plenary lecture, 18 main lectures, and 78 short communications read in three parallel Sections:

1. Reactivity and Structure of Radicals in Polymer Systems
2. Modifications of Polymers by Transformation Reactions
3. Degradation and Stabilization of Polymers

The plenary lecture of G. SMETS (Belgium) was concerned with various photochromic systems occurring in polymer chemistry, mainly based on *cis-trans* isomerization of azomethines and azo-compounds built into the polymer backbone or its side groups. In this lecture, special attention was paid to spirobenzopyrane derivatives, the photochromism of which is peculiarly characterized by a strong negative solvatochromism. Of the polymers containing spirobenzopyrane photochromes, copolymers with vinyl monomers (with both methyl methacrylate and styrene), further polypeptides, such as polytyrosine and polylysine, as well as some polycondensation products were dealt with. The properties of these polymers were investigated in both the solid state and in solution. The systems referred to suggest the possibilities of change of light energy into mechanical energy.

In the first Section, new results and knowledge obtained in solving partly topical and open problems from earlier investigations and partly newer ones arisen only recently were submitted.

Radical polarity as a remarkable parameter of their reactivity has been attracting the attention of macromolecular chemistry for 25 years. Starting from the original Alfrey-Price's Q-scheme, A. D. JENKINS (UK) referred to and compared the fundamental theories of radical reactivity and came to the conclusion that at present the 'Patterns' treatment remains the only approach to avoid assignment of arbitrary standard parameters of reactivity.

Alike, the mechanism and kinetics of polymerization reactions, the scientific foundations of which date back to the very beginning of macromolecular chemistry, still remain important research concerns. One of these particularly topical regions, that of radical polymerization in the solid state, was the object of S. OKAMURA's (Japan) lecture, giving a complete image of the specificity of the effect of the physical state of monomer and its structure on the character of the course of the chain process, as well as of its resulting product. In conjunction with polymerization A. CHAPIRO's (France) data on unusual kinetic features observed in both the acrylic acid and acrylamide polymerization attributed to monomer molecule association proved to be of

interest. Since the propagation rate constant is affected by the degree of monomer aggregation, which in turn is the function of solvent, the latter may serve for the control of propagation kinetics.

Over a relatively great range, problems of macroradical reactivity which, thus, could not have been left unnoticed, some extreme aspects, *i.e.*, stable and very reactive polyradicals, were dealt with. The theme of stable macroradicals was exhausted by D. BRAUN (GFR) who in his lecture dealt more thoroughly with preparative method, properties, reactions, and applications of both the neutral polyradical and the polyradicaliones, as well as of polymer charge transfer complexes. P. J. BUTJAGIN (USSR) summarized the aspect of marked activity of macroradicals manifested in their interaction in a polymer medium. He indicated kinetic laws and peculiarities of migration mechanisms of free valence in the processes of radical decay with respect to polyethylene and polymethyl methacrylate.

The working programme of the first Section also covered the formation of radicals in polymer systems, their reactions with matrix, as well as the reactivity and spectral properties of macroradicals and the peculiarities of their decay.

In the second Section, results from the field of polymer grafting, branching and crosslinking, and those of polymeranalogous transformations, as well as of other modification methods of macromolecular systems and study of their properties were submitted.

A survey of the present state of polymer grafting and branching research in conjunction with the synthesis of various types of model compound applicable to morphological and thermodynamic study in dilute solutions was presented in the lecture of P. REMPP (France). L. D. LOAN (USA) submitted a survey of the mechanism of polymer crosslinking by peroxides and C. H. BAMFORD (UK) related the formation of networks as well as some of their properties studied in copolymers of polyvinyl trichloroacetate and polyvinyl bromoacetate with polymethyl methacrylate, polystyrene, and polychloroprene, respectively. The morphology of these networks is determined by the opposition between thermodynamic incompatibility component of homopolymers and the constraints arising from the network structure geometry.

R. C. SCHULZ's (GFR) lecture was aimed at analogous reactions of macromolecules from the viewpoint of their comparative study with low molecular models. Polymer effects, *i.e.*, phenomena to which quite a different reaction course or different reaction products, when compared with the similar reaction of the low molecular model, are attributed, were shown through the example of three reactions.

In the lecture of N. A. PLATÉ (USSR), *Some Problems of Chemical and Physical Micromodification of Polymer Systems*, the task of microadditives or microadmixtures built into polymer systems of strange elements or groups was evaluated. Already one chemically different molecule per 10-100 macromolecules leads to a change of supermolecular polymer structure bringing about that of both its macroproperties and the reactivity of the system. Of several utility effects of polymer modification quite a prominent place has to be attributed to the perspectively remarkable preparation of semipermeable membranes from polymer materials which might be used in practice, *e.g.*, in desalting sea and break water, artificial kidney, production control of contaminated water, and uranium-235 and -238 separation. The problems of polymer chemistry associated with the preparation of these semipermeable membranes were reported by M. PEGORARO (Italy).



The third Section embraced investigations concerning degradation, oxidation, and ageing of polymers and copolymers due to either the effects of light or heat as the main factor or also to simultaneous action of both of them, as well as to the inhibitory mechanism of degradation processes and stabilization of various polymer objects.

The field of photodegradation and light stabilization of polymers was represented by papers aimed not only at the applied aspect of prolongation of polymer material life-time on exposure to light, but also by those concerning the basic measurements of polymer photophysics and photochemistry at all. As an introduction to these problems could well be looked upon the lecture of R. B. FOX (USA), which dealt with the elementary photophysical processes, their importance for polymers (migration of intramolecular energy) and the relation to photochemical reactions including macromolecular photodegradation. Polymer photochemistry itself was related by M. A. GOLUB (USA) who paid attention to the mechanism of reactions involving irradiation of thin films of unsaturated polymers of isoprene and butadiene structure. At this opportunity also some newer investigations on photoinduced microstructural changes in *cis* and *trans* polypropylenes were discussed.

The results of the investigations submitted by J. E. GUILLET (Canada) showed that the phenomenon of polymer ageing is not only a direct function of its native structural properties but depends also on the prehistory of the polymer material (its production and processing), when ketonic carbonyl groups forming centres of ultraviolet absorption initiating polymer degradation are built into macromolecules by oxidation. The light protection of polymers itself was already related by H. J. HELLER (Switzerland) from the viewpoints of both the mechanism of light stabilizer action and their classification and efficiency.

From the field of thermal degradation of polymers N. GRASSIE (UK) brought some newer knowledge obtained in the study of acrylate and methacrylate homopolymers and copolymers where a direct connection between the number of  $\beta$ -hydrogen atoms of the ester group and the mechanism of the degradation process was found. The influence of metal compounds on polymer degradation was dealt with in the lecture of K. VESELY (Czechoslovakia), in which low molecular model substrates were used as objects of the study and their oxidation by cobalt(III) was checked in the presence of and without oxygen. G. SCOTT's (UK) lecture was devoted to the problem of polymer protection against thermooxidative degradation. Here, decisive factors determining, besides the proper activity of antioxidants, their actual efficiency (compatibility of antioxidant with polymer and the rate of polymer weight loss due to its volatilization), as well as progress in recent studies of the mechanism of sulphide and phosphite antioxidant action were discussed.

Full texts of the short communications submitted, were issued by the Conference organizers as preprints for the participants. Their publication is scheduled for 1972 in the journal *Chemical Papers* edited by the Slovak Academy of Sciences. The main lectures read at the Conference will be published in the official IUPAC journal *Pure and Applied Chemistry* and they will also be available as a specially bound reprint.

R. RADO

## **11th INTERNATIONAL CONFERENCE ON CALORIMETRY AND THERMODYNAMICS Orono, Maine, 12-14 July 1971**

The Conference (simultaneously the XXVIth Annual Calorimetry Confer-



ence) was sponsored jointly by the Calorimetry Conference (USA) and the Commission on Thermodynamics and Thermochemistry of IUPAC. Of 175 participants, 18 were from Canada and 27 from twelve overseas nations.

The principal categories of study reported were the thermodynamic properties of gases and of electrolytic and nonelectrolytic solutions, thermodynamic properties of solids at high and low temperatures, reaction calorimetry and other thermochemical studies, and biochemical calorimetry. Over one-fourth of the 96 papers dealt primarily with apparatus for these and other investigations.

H. V. KEHIAIAN (Poland) reported on a new international project, *International DATA Series, Selected Data on Mixtures* for compilation of values of physicochemical properties of fluid mixtures of nonelectrolytes. It is proposed that research workers transmit their data on standard format tables to an editorial board for collation and publication.

A. G. WILLIAMSON (New Zealand) described measurements of the volume and heat of mixing of gaseous benzene and cyclohexane. The results indicate that many values of the unlike virial coefficients derived from compressibility measurements are in error.

E. U. FRANCK (German Federal Republic) reported on PVT measurements of ammonia to 10 kbar and 500°C and on critical curves and phase boundaries of several binary systems with water. Infrared spectra of homogeneous dense supercritical mixtures of water and carbon dioxide show a specific interaction.

R. VILCU (Romania) described heat-of-mixing and differential-cryoscopic studies of ternary aqueous electrolyte solutions. The excess Gibbs energies and excess enthalpies of mixing determined by the two methods were in excellent agreement and were the same as those obtained from the Mayer cluster theory.

P. PHILIP (Canada) described a flow calorimeter utilizing a cumulative thermal loop to amplify the temperature rise produced by mixing two fluids. The mixing chamber was isolated by having the input and output streams in thermal contact in a counterflow heat exchanger.

A. CEZARLIYAN (USA) reported on measurements of the heat capacity and electrical resistivity in the range 2000 to 3600 K by a pulse-heating method. The duration of an experiment in which the sample was heated from room temperature to near its melting point was less than one second. The estimated inaccuracy in the above temperature range was 2-3%.

R. H. BUSEY (USA) presented results on low-temperature heat-capacity measurements of  $^7\text{LiH}$  and  $^7\text{LiD}$  and their comparison with frequency distribution curves calculated from neutron-scattering and other experiments.

V. SRIKRISHNAN (USA) reported on the use of fluorine bomb calorimetry for the study of the enthalpies of formation of intermetallic compounds predicted by the Engel-Brewer correlation to have high stability.

G. K. JOHNSON (USA) discussed measurements of the enthalpies of formation of the xenon fluorides by reduction with  $\text{PF}_3$  in a bomb calorimeter.

J. V. DAVIES (Canada) described the use of a large diphenyl ether calorimeter to measure the standard enthalpy of formation of phosgene by comparison of the heats of alkaline hydrolysis of phosgene and of an equivalent carbon dioxide-hydrogen chloride mixture. The result, unlike earlier calorimetric studies, is in good agreement with the value derived from equilibrium studies.

C. E. VANDERZEE (USA) reported on extensive thermochemical studies on gaseous and aqueous ammonia and aqueous ammonium ion, involving measurements of the enthalpies of combustion of succinic acid and its

ammonium salts and enthalpies of solution of ammonia in dilute aqueous sodium hydroxide and hydrochloric acid and new third-law calculations from data on the ammonia formation equilibrium. The results also bear on the nitric acid correction in combustion calorimetry.

S. J. GILL (USA) gave results of measurements of the enthalpy of reaction of carbon monoxide with two myoglobins and with human hemoglobin, using a gas microcalorimeter in which gas uptake and heat evolution were measured simultaneously. The two myoglobins differed substantially in the entropy of binding, and the hemoglobin differed from the myoglobins in that the enthalpy of reaction decreased with increasing degree of saturation.

F. REYNOLDS (USA) reported on the thermodynamics of the interaction of copper(II) with bovine plasma albumin. The extent of reaction was measured by equilibrium dialysis and the enthalpy of reaction by microcalorimetry. Two classes of binding site with different association constants were identified; the enthalpy change was constant for the first several ions bound.

T. G. KOLLIE (USA), C. M. CRISS (USA), and D. L. MARTIN (Canada) gave separate reports on the use of computers for control and data acquisition in calorimetry.

M. L. REILLY (USA) and D. C. GINNINGS (deceased) reported on measurements of blackbody radiation from sources down to 0°C, using a heat-flow calorimeter operated at liquid helium temperatures. A sensitivity of 0.002° was achieved at 0°C. This system should be of great value in checking the consistency of the International Practical Temperature Scale at all temperatures above the ice point.

G. ORME (UK) reported on the development of a continuous coal-burning calorimeter for monitoring calorific value of the coal feed to power plant boilers.

The Conference was intended to be of an informal nature, the presentation of incomplete work being encouraged. Accordingly, no proceedings are to be published: abstracts were distributed, however, at the actual meeting.

S. R. GUNN

### **IIIrd SOCIETY FOR ANALYTICAL CHEMISTRY CONFERENCE**

**Durham, 12-16 July 1971**

The IIIrd SAC Conference of Analytical Chemistry, the first under the sponsorship of IUPAC, was held at University of Durham. The Conference was the largest so far and, by general consent, even more successful than its two predecessors held in 1965 and 1968, both at University of Nottingham.

Some 369 delegates, accompanied by 67 guests, seemed an ideal number; large enough to ensure a varied and well-balanced scientific programme with lively and informed discussion and yet small enough to ensure that a friendly and personal atmosphere, so important for the renewal of old and the fostering of new contacts, permeated the whole proceedings. Well over a third of the delegates had travelled from outside of UK and represented 31 countries to give a truly international aspect to the meeting.

Highlights of the scientific programme were the four plenary lectures, which exemplified the international nature of the meeting. Prof. G. PORTER, Nobel Laureate and President of the Chemical Society (London), spoke on

*Spectroscopic Analysis of Very Fast Reactions*. Prof. H. KAISER's contribution was entitled *General Logical and Mathematical Relationships in Chemical Analysis*. Prof. K. SIEGBAHN spoke on *Electron Spectroscopy for Chemical Analysis* and Prof. I. M. KOLTHOFF on *Acid-Base Equilibria and Titrations in Atomic Solvents*. With his opening remarks Prof. KOLTHOFF, formerly President of the Analytical Chemistry Division of IUPAC, combined a message of greetings and good wishes from the Union for whom he was the officially appointed Delegate.

The contributed papers were 83 in number and dealt with six main topics of analytical chemistry: automatic methods of analysis, chemical methods, gas chromatographic methods, electroanalytical methods, molecular and nuclear spectroscopic methods, and thin-layer chromatography and electrophoretic methods. The papers were arranged in three concurrent streams and a notable feature of the organization, greatly appreciated by delegates, was the clockwork precision with which the timetable was maintained.

During the Conference there was a comprehensive exhibition of scientific apparatus and ancillary items which attracted considerable attention; 38 exhibitors had displays in one of the three chemistry laboratories of the University set aside for the purpose and every effort was made by the organizers to ensure that a good attendance was maintained throughout the week. Attendance at the contributed papers, too, was gratifying; for the last session the lectures were as well attended as they had been on the first morning and this is surely an unusual occurrence.

Scientific aspects of the week's activities were supplemented by a comprehensive social programme. Indeed, on the Wednesday social affairs were in complete control: a variety of excursions took delegates away from Durham leaving the exhibition open for an estimated 500 visitors from local industrial and academic organizations having an interest in analytical chemistry. The excursions included the purely recreational diversions afforded by visits to beauty spots and sites of historical interest with which North East England abounds and also, for the more serious minded, visits to nearby organizations of scientific interest.

C. A. JOHNSON

## **IVth INTERNATIONAL CONFERENCE ON ATOMIC MASSES AND FUNDAMENTAL CONSTANTS**

**Teddington, 6-10 September 1971**

Previous Conferences in this series, held under the auspices of the Commission on Atomic Masses and Related Constants of IUPAP, have been held during the past decade in Hamilton (Ontario), Vienna, and Winnipeg. This year the Conference was held at the National Physical Laboratory, Teddington, and IUPAC was a cosponsor. It was attended by nearly 100 participants from Australia, Belgium, Canada, Denmark, France, Germany, Hungary, Israel, Japan, Netherlands, Sweden, USA, and USSR, as well as from UK.

Undoubtedly the most exciting news in the atomic mass part of the conference was the very significant increase in precision in measurements of atomic masses or mass differences, both for very light and for very heavy elements. These have now reached the stage where careful consideration of atomic electron-binding effects are necessary. It should be remembered that mass spectroscopic measurements yield mass ratios of atomic or molecular ions once or doubly ionized. The electrons removed from their electron shells



always belong to the outer shells and therefore have binding energies of only a few electron-volts or a few tens of electron-volts in exceptional cases (atomic hydrogen or helium). The atomic mass unit, however, corresponds to nearly  $10^9$  eV. Yet, the new measurements on hydrogen and helium of LINCOLN G. SMITH in Princeton reported at the conference need corrections for these effects of the order of one part in  $10^9$ . A nuclear reaction energy measurement of the same order of accuracy was reported by Dr. BERGKVIST from Stockholm, who measured the endpoint of the electron spectrum of tritium with a statistical accuracy of only 2 eV. As pointed out by him, though, there is in reality a series of endpoints not only dependent on what happens to the atomic electron of the  $^3\text{He}^+$  ion formed in this decay. Not only atomic but even molecular binding energy, and indeed surface binding potentials do play an observable role. Unfortunately, a difference of some tens of electron-volts exist between the mass difference between neutral  $^3\text{H}$  and  $^3\text{He}$  ions as calculated from this endpoint, and the value computed by L. G. SMITH; solving this discrepancy will be an interesting subject for the next few years.

The old question whether observed nuclear reaction energies correspond more closely to differences in atomic masses or differences in nuclear masses was raised again by PARKINSON (Michigan). Some new empirical data with a bearing on this subject were also presented at the conference. Dr. W. H. JOHNSON (Minneapolis) reported mass measurements on uranium and thorium atoms with a precision of a few  $\mu\text{u}$  (or keV). Combination with earlier lead-measurements of rather similar precision then gives mass differences that can also be calculated from (mainly) alpha decay energies. Series of such alpha decay energies with precisions of several tens of an electron-volt, and therefore again requiring correction for atomic electron binding energies, were reported by Dr. A. RYTZ from Paris. Comparison of the results show indeed much better agreement with atomic mass differences than with those of bare nuclei.

Mass values for very exotic nuclei are now available. A new tool for measuring them was presented by D. K. SCOTT, Oxford, who measured the reaction energy of the  $^{26}\text{Mg}$  ( $^{11}\text{B}$ ,  $^8\text{B}$ )  $^{29}\text{Mg}$  reaction; several similar results were presented by CERNY. In the field of determination of gamma ray energies, *e.g.*, in neutron and proton capture, steady progress is made. Also, improved mass formulae offer more accurate prediction of atomic masses than has been the case in earlier days.

A new calculation of atomic masses of pure nuclides from all available experimental material, discussed by WAPSTRA and GOVE, will be published shortly.

In the field of fundamental constants it was evident that there is no slackening of effort. Measurements are continuing using already well-established techniques, and one could not fail to be impressed by the extreme refinements that are being introduced into such determinations as that of the Rydberg by spectroscopic methods and the gyromagnetic ratio of the proton by the measurement of the proton spin resonance frequency in a field known in terms of the ampere. But the greatest achievement and promise has resulted from the discovery of the Josephson effect (which leads to a direct and unequivocal value for  $2e/h$ ), and from the development of techniques which are extending the range of frequency measurement from the microwave region into the infrared.

The a.c. Josephson effect in superconducting junctions is now being used in most of the standard laboratories throughout the world to measure  $2e/h$

in terms of the local voltage standard (*i.e.*, standard cells). Individual determinations have an uncertainty of about 1 part in  $10^7$ , and agreement between various laboratories appears to be approaching this order of accuracy, though doubts about the validity of the intercomparison of the voltage standards used at the time of the experiments provoked lively discussion.

The Josephson junction is also being used by Dr. D. G. McDONALD (National Bureau of Standards) and his collaborators to achieve harmonic mixing with the object of extending the range of frequency measurement from microwave standards to the emission from lasers such as the HCN (300-400  $\mu\text{m}$ ),  $\text{H}_2\text{O}$  (28, 78, and 119  $\mu\text{m}$ ). Similar work is in progress at the National Physical Laboratory by Dr. C. C. BRADLEY and others, using metal-oxide-metal diodes. Their aim is the measurement of the frequency of the output of a  $\text{CO}_2$  laser (in the 10- $\mu\text{m}$  region) and by harmonic generation of this wavelength in a crystal, the determination of the frequency of a visible wavelength. Such a measurement leads, of course, to the determination of the velocity of light in terms of the presently defined standards of length and time; alternatively it could mean an eventual acceptance of the velocity of light as a primary standard. In the meantime work is progressing on the possible use of methane-stabilized He-Ne laser as a wavelength standard of greater precision than the present  $^{86}\text{Kr}$  lamp.

The position regarding the values of the fundamental constants were reviewed by E. R. COHEN and B. N. TAYLOR, who stressed the importance of the need for a remeasurement of the Faraday (currently being undertaken at National Bureau of Standards by Dr. V. E. BOWER) to remove the present discrepancy with the measurement of the proton moment in nuclear magnetons, and the growing confidence in measurements involving quantum electrodynamics for their interpretation (such as the hyperfine splitting in hydrogen, and Lamb shifts).

Participants at the Conference were unrestrained in their praise for the smoothness of the organization, which was entirely due to the work of the many members of the National Physical Laboratory whose generosity in devoting their time and effort to the Conference contributed so much to its success.

J. H. SANDERS  
A. H. WAPSTRA

## FORTHCOMING IUPAC-SPONSORED SYMPOSIA

### VIIIth INTERNATIONAL SYMPOSIUM ON CHEMISTRY OF NATURAL PRODUCTS

New Delhi, 6-12 February 1972

The inaugural meeting will take place at Vigyan Bhavan. Plenary lectures will be delivered in the auditorium of the Indian Medical Association. Sectional meetings at which contributed papers will be read and discussed will be held in the buildings of the Indian National Science Academy, the Indian Medical Association and the Institution of Engineers. These three buildings are within easy walking distance of each other.

The weather in New Delhi in the first half of February is usually sunny. The temperature ranges from 20°C during daytime to 5°C at night.

#### Plenary Lectures

Ten plenary lectures will be delivered at the Symposium by the following distinguished scientists:

- |                         |   |
|-------------------------|---|
| D. H. R. BARTON (UK)    | Some Progress in Natural Products Chemistry   |
| A. J. BIRCH (Australia) | Biosynthetic Pathways in Chemical Phylogeny   |
| E. R. H. JONES (UK)     | Microbiological Hydroxylation of Steroids and Related Compounds                     |
| H. G. KHORANA (USA)     | Total Synthesis of Genes for Transfer Ribonucleic Acids                             |
| N. K. KOCHETKOV (USSR)  | Some New Trends in Polysaccharide Chemistry   |
| G. OURISSON (France)    | Recent Progress in Organic Geochemistry—Samsara of Organic Compounds in Sediments   |
| H. SCHMID (Switzerland) | Macrocyclic Spermine- and Spermidine-Alkaloids                                      |
| S. SHIBATA (Japan)      | Some Recent Studies on Metabolites of Fungi and Lichens                             |
| H. UMEZAWA (Japan)      | Chemistry and Biochemistry of Specific Enzyme Inhibitors Produced by Microorganisms |
| R. B. WOODWARD (USA)    | Recent Advances in the Chemistry of Natural Products                                |

The lectures will be given in English. They will be published in English in *Pure and Applied Chemistry*, the official journal of IUPAC and will also be issued as a specially bound reprint.

#### Contributed Papers

Contributed papers of special interest and novelty on Natural Products Chemistry will be presented under the following sections:

- A Alkaloids
- B Polyphenolics
- C Terpenoids and Steroids
- D Macromolecules of Biological Interest (Proteins, Peptides, Nucleic Acids, etc.)
- E Carbohydrates, Lipids and Related Substances
- F Other Topics in Natural Products Chemistry including Physical Methods of Structure Determination



## Symposium Language

The official language of the symposium will be English. Contributed papers may be presented in any language, but the Organizers suggested that speakers should, as far as possible, use English, which is commonly understood by most participants, because no arrangement has been made for simultaneous translation.

## Pre- and Post-Symposia

One Pre- and one Post-Symposium with a limited number of participants will be held as follows:

*Pre-Symposium* at Lucknow from 4 to 5 February 1972. The title of the Symposium will be *Biogenesis and Synthesis in the Chemistry of Natural Products*.

*Post-Symposium* at Poona from 15 to 16 February 1972. The title of the Symposium will be *Art and Science of Organic Synthesis in the Field of Natural Products*.

## Correspondence

Correspondence relating to arrangements for reservation of hotel accommodation in New Delhi and other places in India and travel to or within India, if desired to be made through the official agents, should be addressed to:

Messrs Travel Corporation (India) Pvt. Ltd.  
C 35, Connaught Place  
New Delhi 1  
India

Correspondence relating to all other matters concerning the Symposium should be addressed to the Symposium Secretary as follows:

Prof. S. RANGASWAMI  
Secretary, Symposium Committee  
VIIIth IUPAC Symposium  
Indian National Science Academy  
Bahadur Shah Zafar Marg  
New Delhi 1, India

## IVth INTERNATIONAL FERMENTATION SYMPOSIUM

**Kyoto, 19-25 March 1972**

The Symposium will be held at the Kyoto International Conference Hall, Takaragaike, Sakyo-ku, Kyoto. It is jointly sponsored by the Science Council of Japan, the Fermentation Industries Section of IUPAC, and the Society of Fermentation Technology of Japan in cooperation with the International Organization for Biotechnology and Bioengineering and the Agricultural Chemical Society of Japan.

It will be devoted to the future development of fermentation technology. With an emphasis on the recent progress in related fields of science, fundamental and engineering, the Symposium will provide a forum for scientific discussions on the current state and future prospects of industrial fermentations.

## Subjects and Cochairmen of Sessions

In compliance with the suggestion of Prof. T. O. WIKÉN, Chairman of the Commission on Yeasts and Yeast-like Microorganisms/IAMS, a few additional sessions relevant to a Yeast Symposium (asterisked) will also be held.

### *Focal Topics Sessions*

- |     |   |  |
|-----|---|--|
| 1   | Fermentation Dynamics   | S. KOGA (Japan)                        |
|     |   | H. M. TSUCHIYA (USA)                   |
| 2   | Mass Transfer and Scale-up  | H. TAGUCHI (Japan)                     |
|     |   | M. MOO-YOUNG (Canada)                  |
| 3   | Continuous Culture  | K. UEDA (Japan)                        |
|     |   | R. I. MATELES (Israel)                 |
| 4   | Instrumentation for Process Control   | S. YAMASHITA (Japan)                   |
|     |   | P. SHU (USA)                           |
| 5   | Genetics Applied to Process Improvement   | H. SAITO (Japan)                       |
|     |   | G. SERMONTI (Italy)                    |
| 6   | Amino Acids and Nucleic Acid-related Products by Fermentation                         | H. AIDA (Japan)                        |
|     |   | B. J. RALPH (Australia)                |
| 7-1 | Microbial Enzymes (I)   | J. FUKUMOTO (Japan)                    |
| 7-2 | Microbial Enzymes (II)  | L. L. CAMPBELL (USA)                   |
| 8   | Water-insoluble Enzyme Derivatives  | I. CHIBATA (Japan)                     |
|     |   | E. KATCHALSKI (Israel)                 |
| 9   | Physiologically Active Substances by Fermentation                                     | Y. OKAMI (Japan)                       |
|     |   | A. L. DEMAINE (USA)                    |
| 10  | Biomass from Noncarbohydrate Organic Substances                                       | J. TAKAHASHI (Japan)                   |
|     |   | G. HAMER (UK)                          |
| 11  | Utilization of Autotrophic Microbes   | S. FUKUI (Japan)                       |
|     |   | H. LEES (Canada)                       |
| 12  | Microbiological Waste Treatment   | H. ONO (Japan)                         |
|     |   | R. K. FINN (USA)                       |
| 13  | Recent Progress in Traditional Fermentation Industries                                | R. TONOIKE (Japan)                     |
|     |   | HSI HUA WANG (Rep. China)              |
| 14  | Tissue Culture  | T. FURUYA (Japan)                      |
|     |   | L. G. NICKELL (USA)                    |
| 15  | Novel Fermentation Products   | T. HARADA (Japan)                      |
|     |   | M. E. SLEDKI (USA)                     |
| 16  | Production and Use of Enzymes Active in Hydrolyzing Cell Walls and Related Substances | K. NISIZAWA (Japan)                    |
|     |   | G. PETTERSON (Sweden)                  |
| 17  | Process Design and Product Recovery   | T. KOBAYASHI (Japan)                   |
|     |   | V. H. EDWARDS (USA)                    |
| 18* | Taxonomy and Ecology of Yeasts  | K. TUBAKI (Japan)                      |
|     |   | J. P. VAN DER WALT (Rep. South Africa) |
| 19* | Subcellular Structure and Function of Yeasts  | T. HIRANO (Japan)                      |
|     |   | H. SUOMALAINEN (Finland)               |
| 20* | Sexuality, Gene Action and Breeding of Yeasts (Specialists' Meeting)                  | N. YANAGISHIMA (Japan)                 |
|     |   | H. O. HALVORSON (USA)                  |

### *General Paper Sessions*

Not less than 7 general paper sessions will be held.

## **Symposium Language**

Papers at the Scientific Sessions will be read in English or in Japanese. Simultaneous interpretation will be provided, where possible.

## **Travel and Accommodation**

Reservations for travel within Japan, hotel accommodation and post-Symposium tours may be made with the official travel agent at the following address:

Conventions Section, Kyoto Office  
Japan Travel Bureau Inc.  
Station Hotel Building  
Shimogyo-ku, Kyoto 600, Japan

## **Registration**

Those wishing to participate in the Symposium should write to:

Executive Secretary of Organizing Committee  
IVth International Fermentation Symposium  
c/o Department of Fermentation Technology  
Osaka University, Yamada-Kami  
Suita-shi, Osaka 565, Japan

## **IUPAC INTERNATIONAL CONGRESS ON ANALYTICAL CHEMISTRY**

**Kyoto, 3-7 April 1972**

Organized by the Japan Society for Analytical Chemistry, under the sponsorship of IUPAC and the Science Council of Japan, this Congress will be held in the Kyoto International Conference Hall. Post-Congress Symposia are planned for Sendai, Tokyo, Hiroshima, and Fukuoka.

## **Scientific Programme**

The scientific programme will cover most areas of analytical chemistry, and will include the following sections:

- A Electrochemical Analysis
- B Spectrometric Analysis
- C Radiochemical Analysis
- D Chromatography
- E Organic Analysis
- F Miscellaneous Methods.

Special emphasis will be given to trace analysis and the use of nonaqueous solvents. About 300 papers are expected to be presented.

## **Invited Lecturers**

The following have agreed to give the plenary and section lectures:

- |                         |   |
|-------------------------|---|
| I. P. ALIMARIN (Moscow) | Kinetics of Complex Formation of Metals with Organic Ligands in Analytical Chemistry    |
| R. BELCHER (Birmingham) | Application of Chelate Compounds in Analytical Chemistry                                |
| G. CHARLOT (Paris)      | Sur l'Analyse des Réactions en Milieu non aqueux au moyen des Méthodes électrochimiques |



H. KAISER (Dortmund)	Guiding Concepts relating to Trace Analysis
W. J. KIRSTEN (Uppsala)	Developments in Quantitative Organic Ultra- micro Elementary Analysis
I. M. KOLTHOFF (Minneapolis)	Acid-base Equilibria and Titrations in Aprotic Solvents
A. J. P. MARTIN (Kent)	Problems of Detection
W. W. MEINKE (Washington)	Is Radiochemistry the Ultimate in Trace Analysis?
E. PUNGOR (Budapest)	Precipitate based Ion-selective Electrodes— Their Theory and Application
A. WALSH (Clayton)	Non-dispersive Systems in Atomic Spectroscopy
P. W. WEST (Baton Rouge)	Analytical Studies of the Environment

These lectures will be published later in the journal of IUPAC *Pure and Applied Chemistry*.

### **Congress Language**

The Congress will have no official language, but English will be preferable as it is comparatively familiar to the participants. Abstracts of papers and the information bulletin of the Congress will be published in English.

### **Correspondence**

Enquiries about the scientific programme and registrations should be sent to:

Organizing Committee  
International Congress on Analytical Chemistry  
Kyoto International Conference Hall  
Takaraike, Sakyo-ku, Kyoto 606, Japan

Requests for hotel accommodation and for post-Congress tours should be addressed to:

International Congress on Analytical Chemistry  
c/o Convention Section, Kyoto Office  
Japan Travel Bureau Inc.  
Station Hotel Building  
Shimogyo-ku, Kyoto 600, Japan

## **MICROSYMPOSIUM ON PHOTOCHEMICAL PROCESSES IN POLYMER CHEMISTRY**

**Louvain, 12-15 June 1972**

The scientific sessions will take place on the campus of the Louvain University, KUL. The programme will consist of two plenary lectures and eight main lectures given by invited speakers, and a limited number of short communications (20 minutes). These communications should be submitted before 1st March 1972 and presented by the participants. The programme includes the following topics:

1. Photoinitiated Polymerization
2. Photopolymerization
3. Photodegradation and Phototransformation
4. Photochemistry of Biopolymers

Because no translation will be provided it is recommended that speakers use English.

### **Correspondence**

Inquiries and all correspondence concerning the Microsymposium should be addressed to the Secretary:

Prof. F. C. DE SCHRIJVER  
Chemistry Department  
University of Louvain  
Celestijnenlaan 200 F  
B-3030 Heverlee, Belgium

## **XIVth INTERNATIONAL CONFERENCE ON COORDINATION CHEMISTRY**

**Toronto, 22-28 June 1972**

The Conference will be based at University of Toronto, although two plenary sessions will be held at York University.

### **Subject Sessions**

These will be divided into four main areas, Synthetic Inorganic Chemistry, Reactivity, Structure, and Theoretical Inorganic Chemistry. Specific symposia will be:

Metal Catalyzed Organic Reactions (Biochemical Aspects of Inorganic Chemistry and Industrial Catalysis);  
Physical Methods;  
Nature of Bonding Sites;  
Inorganic Photochemistry and Inorganic Electrochemistry;  
Principles of Industrial Applications in Coordination Chemistry;  
Stereochemistry, Conformation and Molecular Disymmetry.

While papers may be accepted on any subject relating to coordination chemistry, papers are invited especially in the areas mentioned. The language of the Conference will be English and it is expected that papers will be read in that language. No translation facilities will be provided.

### **Accommodation**

Accommodation may be booked at the student hostels of University of Toronto. Hotel accommodation is also available, but the cost of hotel rooms in Toronto is high.

### **Travel**

Toronto has an international airport and has direct flights to most parts of the world. Canadian Pacific Airlines has been appointed the official airline for the Conference. Immediately preceding the Conference the American Chemical Society and Chemical Institute of Canada Inorganic Divisions will be holding a conference in Buffalo, New York, and bus transportation to Toronto will be available for delegates from the Buffalo Conference who are also attending the XIV ICC.

## **Trips and Social Events**

A number of social events will take place in connection with the conference, generally in the evenings. In addition some sightseeing trips are planned for the weekend break. There will be a full ladies programme.

## **Weather**

The normal average temperature for Toronto in June is 18.9°C, with typical extremes of 33°C and 6°C. The normal rainfall is 2.33 inches making June the driest month of the year.

## **Conference Office**

All queries should be addressed to the Chairman of the Organizing Committee at the Conference office:

Dr. C. J. L. LOCK  
Institute for Materials Research  
McMaster University  
Hamilton, Ontario  
Canada

## **INTERNATIONAL SYMPOSIUM ON MACROMOLECULES**

**Helsinki, 2-8 July 1972**

The scientific sessions will take place on the campus of Helsinki University of Technology, Otaniemi, just outside Helsinki itself.

## **Topics**

The programme has been planned to include the following topics:

1. Polymerization and Copolymerization Reactions
2. Solution Properties and Characterization Methods of Polymers
3. Bulk Properties of Polymers
4. Degradation and Decomposition of Polymers
5. Polysaccharides and their Derivatives

The first three themes cover the classical field of polymer chemistry. In order to avoid excessive expansion of the programme it may become necessary to limit the number of papers accepted. In this case preference will be given to those whose emphasis is towards new aspects of theoretical problems or of technical application. Degradation and decomposition of polymers are in view of their topicality included in the programme as a separate section. The last theme is chosen to represent a traditionally Scandinavian field of macromolecular chemistry.

## **Presentation of Papers**

The scientific programme will consist of *main lectures* given by invited speakers in each section and *short communications* which any participant may submit.

## **Symposium Language**

Because no simultaneous translation will be provided, it is recommended that speakers use English.



### **Official Carrier**

Finnair, the official carrier for the Symposium, has offered to provide the participants with information on special transport arrangements and tourism in Finland.

### **Correspondence**

Enquiries and other correspondence concerning the Symposium should be addressed to:

Dr. J. LARINKARI  
Federation of Finnish Chemical Industry  
POB 13 028  
00130 Helsinki 13, Finland  
Phone: 10 300  
Cable: Chemcongress

## **IUPAC INTERNATIONAL SYMPOSIUM ON CHEMISTRY IN EVOLUTION AND SYSTEMATICS**

**Strasbourg, 3-8 July 1972**

The meeting will take place at the Université Louis Pasteur. Participants will have the choice of accommodation in student hostels at the University or in hotels in Strasbourg.

### **Plenary Lectures**

There will be ten plenary lectures to be given by internationally distinguished scientists, covering the following topics:

- 1 Insect-Plant Coevolution
- 2 Chemistry of Geographical Races
- 3 Comparative Aspects of Biosynthetic Pathways
- 4 Molecular Evolution
- 5 Fossil Chemistry

### **Contributed Papers**

The Scientific Committee will consider papers on any aspect of Chemo-systematics but preference will be given to those related to the topics of the plenary lectures.

### **Symposium Language**

The official language of the Symposium will be English and contributed papers should be presented in that language, if at all possible. Papers in French or German will also be accepted. There will be no provision for simultaneous translation.

### **Correspondence**

Correspondence relating to the meeting should be addressed to:

Dr. J. B. HARBORNE  
Secretary, 'Chemistry in Evolution'  
IUPAC Symposium  
Phytochemical Unit, Botany Department  
University, Reading RG1 5AQ, UK

## **VIIth INTERNATIONAL SYMPOSIUM ON CARBOHYDRATE CHEMISTRY**

**Madison, Wisconsin, August 1972**

The meeting is open to all persons interested in the fundamental or applied chemistry or biochemistry of the carbohydrates. All sessions will be on the campus of the University of Wisconsin and in the US Forest Products Laboratory adjoining the campus. A final decision on dates—14-18 or 21-25 August—depends on the academic calendar of the University.

### **Scientific Programme**

The programme will be comprised of five main sections: physical-organic, biochemistry, cellulose, industrial carbohydrates, and organic synthesis and mechanisms.

Each section will include a plenary lecture (invited) and a series of 20-minute lectures (also by invitation). In addition, there will be two or more sessions of contributed papers.

### **Accommodation**

Participants will be housed in a dormitory on the university campus. Alternatively, hotel accommodation can be arranged for those who wish it.

### **Further Information**

All enquiries for further information about the Symposium should be sent to the Secretary of the Organizing Committee:

Prof. L. ANDERSON  
Department of Biochemistry  
University of Wisconsin  
Madison, Wisconsin 53706, USA

## **Ist INTERNATIONAL SYMPOSIUM ON ADVANCES IN MICROBIAL ENGINEERING**

**Marienbad, 28 August-1 September 1972**

This Symposium, originally scheduled for 6-10 September 1971, has had to be postponed until 1972. It is hoped that the scientific programme, division into sections, and invited lectures will remain unchanged (see *Information Bulletin* No. 40, June 1971, pp. 86-87).

## **Ist IUPAC CONFERENCE ON PHYSICAL ORGANIC CHEMISTRY**

**Crans sur Sierre, 4-8 September 1972**

The Conference, sponsored by IUPAC and the Swiss Chemical Society, will be held in the Swiss Alps at the beautiful holiday resort of Crans sur Sierre. Since the resort is not overcrowded at that time of the year, a fruitful atmosphere for meetings and informal discussions is guaranteed.

## Scientific Programme

At the XXVth IUPAC Conference in Cortina d'Ampezzo (1969) it was proposed by the Organic Chemistry Division to start a regular series of IUPAC Conferences on Physical Organic Chemistry in alternate years, commencing 1972. The International Committee formed, decided that this first Conference should concentrate on important developments in the following topics:

- 1 New Methods for Elucidation of Structure of Unstable Intermediates, including Biradicals
- 2 Solvent-Solute Interactions
- 3 Reaction Mechanisms of Organometallic Compounds

## Invited Lecturers

The following scientists have been invited for plenary lectures in the three topics mentioned above:

- Topic 1 J. D. BALDESCHWIELER, H. FISCHER, J. A. POPLE  
Topic 2 E. M. ARNETT, A. E. LUTSKI, C. D. RITCHIE  
Topic 3 E. C. ASHBY, J. HALPERN, G. WILKE

In addition, the International Committee decided to invite J. N. PITTS for a plenary lecture on *Correlations of Physical Organic Chemistry with Environmental Problems* in order to stimulate physical organic chemists to think about potential contributions of their science to the solution of environmental problems of the present and the future.

## Contributed Papers

These are invited on the three topics mentioned above. The International Committee will have the final responsibility for their acceptance.

## Conference Language

Invitation lectures will be given in English. Other contributed papers may be presented in any commonly-understood language but the organizers hope that the speakers will use English. No arrangements will be made for translation.

## Correspondence

All correspondence concerning the Conference should be addressed to:

Prof. H. ZOLLINGER  
Department of Industrial and  
Engineering Chemistry  
Swiss Federal Institute of Technology (ETH)  
Universitätsstrasse 6  
CH-8006 Zürich, Switzerland

## Vth INTERNATIONAL CONGRESS ON SURFACE ACTIVE SUBSTANCES

Zurich, 11-15 September 1972

Comité suisse de la Détergence is organizing this Congress on behalf of Comité international des Dérivés tensio-actifs (CID) in the Swiss Federal Institute of Technology.



## Scientific Programme

Three or four plenary lectures are planned for the Congress, together with a number of scientific papers, provisionally classified into the following sections and groups, including all phenomena occurring at the interface of two different phases (wetting, emulsification, dispersion, foaming, etc.):

### Section A

#### *Chemistry of Surface Active Substances*

- Group A/1 Terminology
- A/2 Constitution and Properties
- A/3 Synthesis and Fabrication
- A/4 Analytical Methods

### Section B

#### *Physical Chemistry of Surface Active Substances*

- Group B/1 Basic Principles and Intermolecular Forces
- B/2 Adsorption and Monomolecular Layers
- B/3 Interfacial Phenomena
- B/4 Cohesion and Adhesion
- B/5 Properties of Solutions of Surface Active Substances
- B/6 Micellar Structures in Solutions of Surface Active Substances

### Section C

#### *Applications of Surface Active Substances*

- Group C/1 Measuring and Testing Methods based on Application Principles
- C/2 Applications in the Detergent Industry
- C/3 Applications in the Textile, Paper, and Leather Industries
- C/4 Applications in Medicine, Agriculture, Cosmetics, and Food-stuffs
- C/5 Applications in Building Constructions, in Metal Treatment, Lubrication, and Flotation
- C/6 Applications in the Manufacture of Plastics and Adhesives
- C/7 Ecology

## Correspondence

Enquiries about participation in the Congress and about submission of papers should be sent to:

General-Sekretariat des VI. Kongresses  
Schweiz. Gesellschaft für Chemische Industrie  
Nordstrasse 15  
CH-8035 Zürich  
Switzerland

## XXIVth IUPAC CONGRESS

**Hamburg, 3-8 September 1973**

The scientific programme will embrace the following sections and topics:

### *Section 1 High Polymers*

1. Kinetics and Reaction Control
2. Structure and Properties
3. Separation Processes and Thermodynamics
4. New Compounds
5. Inorganic High Polymers

*Section 2 Chemistry of Organic Natural Products*

1. Chemistry of Nucleic Acids and Nucleotides
2. Antibiotics
3. Chemistry of Lipids and Prostaglandins

*Section 3 Solid-state Chemistry*

1. Elementary Processes of Material Transport involving Inorganic Solids
2. Principles of Preparative Solid-state Chemistry
3. Principles of Inorganic Structural Chemistry

*Section 4 Compounds of Nonmetals*

1. Compounds of Boron and Silicon
2. Compounds of Nitrogen and Phosphorus
3. Compounds of Sulfur
4. Compounds of the Halogens

*Section 5 Applied Electrochemistry*

1. Electrochemical Engineering
2. Electrochemical Energy Conversion
3. Organic and Inorganic Electrochemistry
4. Electrochemical Surface Treatment

*Section 6 Radiochemistry*

1. Chemical Technology of Nuclear Fuels
2. Transuranium Elements
3. Modern Trends in Preparation of Radionuclides and Labelled Compounds
4. Nuclear Applications to Technological and Environmental Problems

*Section 7 Symposium on Information and Communication in Chemistry*

In addition to the general programme of the Congress the following joint symposia will be held:

1. *Modern Methods for Treatment of Waste Water in Theory and Practice*  
by the Water, Sewage, and Industrial Wastes Section of the Applied Chemistry Division of IUPAC
2. *High Temperature Techniques*  
(with respect to experimental techniques at temperatures in excess of 500°C)  
by the Commission on High Temperatures and Refractories of IUPAC
3. *Symposium on Medicinal Chemistry*  
by the Medicinal Chemistry Section of the Organic Chemistry Division of IUPAC

**Correspondence**

Further information will be available in due course from:

General Secretariat of the XXIVth IUPAC Congress  
Dr. W. FRITSCHÉ  
c/o Gesellschaft Deutscher Chemiker  
Postfach 119075  
D-6000 Frankfurt/Main 8  
Germany

**INTERNATIONAL SYMPOSIUM ON  
MACROMOLECULES**

**Aberdeen, 10-14 September 1973**

Emphasis will be given to the relationship between the science and technology

of polymers, and the programme will be arranged in the following two main sections:

Synthesis and Manufacture  
Physical and Technical Aspects

Each section will consist of a limited number of invited lectures and contributed papers. The Papers Committee will consider papers of special interest and novelty in relation to the following topics with major emphasis on Thermoplastic Polymers and Elastomers, and in particular the relationship between any of these topics.

1. *Manufacture of Polymers* including  
New Processes for Manufacture of Established Polymers  
Manufacturing Processes for New Polymers and their Monomers  
Manufacturing Processes for Control of Polymer or Copolymer Structures  
Scientific Aspects of Operation of Unit Processes in Polymer Manufacture  
Manufacturing Processes involving Reactions on Polymers
2. *Synthesis of Polymers* including  
Polymer Synthesis by New Chemical Routes  
Methods of Controlling Polymer Structure, End Groups, etc.  
Structural Control in Copolymer Systems  
New Polymer Structure and Properties  
Synthetic Reactions involving Polymers
3. *Science and Technology of Fluid Polymers* including and interrelating  
Rheology, Flow, Deformation and Fracture  
Extrusion, injection moulding, and other melt processes; melt strength and fracture; theoretical and experimental rheology; coating, sintering, and other nonmelt processes.  
Structure  
Phase separation; emulsions and plastisols; melt structure; solution properties  
Transport and Mixing  
Fluidization, compaction, bridging; dispersion and aggregation; flocculation and emulsification  
Interfacial Properties  
Adhesion, sealing and lamination; static electricity; surface tension; effects of crystallization and orientation on interfacial properties (papers under this heading may be allocated to section 4 if more appropriate)
4. *Science and Technology of Solid Polymers* including and interrelating  
Morphology and Orientation  
Crystallization; multiphase systems, block copolymers and network structures; anisotropy  
Mechanical Properties  
Deformation, yield, fracture, crazing and fatigue; viscoelastic behaviour including creep; friction and wear; environmental effects  
Other Physical Properties  
Optical, thermal and electrical properties; diffusion and permeability; environmental effects  
Solid-state Processing  
Novel techniques; film and fibre drawing



## Correspondence

Those wishing to be kept informed of arrangements for the meeting should notify:

Dr. J. GIBSON  
The Chemical Society  
Burlington House, Piccadilly  
London W1V 0BN, UK

## SPECIAL PUBLICATION

### BIBLIOGRAPHY ON THE HIGH TEMPERATURE CHEMISTRY AND PHYSICS OF MATERIALS

The Commission on High Temperatures and Refractories of the Inorganic Chemistry Division of IUPAC has sponsored this quarterly publication since 1956. About 200 journals are scanned by contributors in 14 countries for research papers published in the following fields:-

#### *Part 1. Solids and Liquids*

Devices for achieving, measuring, and controlling temperatures above 1500°C; devices for physical measurements above 1000°C; thermodynamic properties below 1000°C of materials with a melting point above 1500°C; properties of all materials above 1000°C; phase equilibria above 700°C; reactions above 700°C; books.

#### *Part 2. Gases*

Each bibliography is normally published less than 2 months after compilation, which makes it one of the quickest retrieval systems available.

The cost is that of printing and mailing only, because the compilers give their services free; typing and circulation secretarial work is provided by courtesy of the Nuffield Research Group in Extraction Metallurgy at Imperial College, London.

The average number of papers is 700 in Part 1 and 250 in Part 2 and the annual subscription (4 issues) is \$6.25 (£2.50), which includes surface mailing to all destinations.

Because there is no sales staff it would be greatly appreciated if orders could be prepaid to 'IUPAC High Temperature Bibliography'. Orders should be addressed to:

Dr. M. G. HOCKING (IUPAC)  
Department of Metallurgy  
Imperial College of Science & Technology  
London SW7 2BP, UK

## **ACTIVITIES OF OTHER INTERNATIONAL UNIONS**

### **IXth INTERNATIONAL CONGRESS OF BIOCHEMISTRY**

**Stockholm, 1-7 July 1973**

The Congress is sponsored by the International Union of Biochemistry and the arrangements are being made by the Swedish National Committee on Biochemistry of the Royal Academy of Sciences.

Scientific contributions will be presented within 9 sections, covering the following fields:

1. Separation Methods for Macromolecules
2. Structure and Function of Proteins
3. Biosynthesis of Nucleic Acids and Proteins
4. Bioenergetics
5. Membrane Biochemistry
6. Immunochemistry
7. Metabolic Function of Oxygenases
8. Regulation of Intermediary Metabolism
9. Biochemistry of Lipids

Each section will include a symposium, consisting of about 20 lectures given by invited speakers, and a number of short, submitted communications, presented either orally or in poster sessions. The programme will also include 4 plenary lectures, and a number of colloquia on selected topics. Scientific exhibits, as well as a social programme and a programme for accompanying members will be arranged.

Correspondence should be addressed to:

Dr. G. AULIN-ERDTMAN, Secretary-General  
IXth International Congress of Biochemistry  
c/o Svenska Kemistsamfundet  
Wenner-Gren Center, 6 tr.  
S-113 46 Stockholm, Sweden

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### **SOCIETY FOR ANALYTICAL CHEMISTRY CENTENARY CELEBRATIONS**

The Society for Analytical Chemistry will celebrate its Centenary in 1974 and proposes to hold special meetings in London during the period 16 to 19 July. The opening meeting will be held at the Royal Institution and will include messages of goodwill from overseas chemical societies. It will be followed by a three-day Conference at Imperial College of Science and Technology. This Conference will consist of three plenary lectures and streams of invited papers. There will be a special banquet in the famous Guildhall of London and the programme will also include social functions and a series of visits.

Correspondence should be addressed to:

Miss P. E. HUTCHINSON, Secretary  
Society for Analytical Chemistry  
9-10 Savile Row  
London W1X 1AF, UK

## IUPAC COLLEAGUES DECEASED

<i>Czechoslovakia</i>	Prof. R. BRDIČKA (25 June 1970)—Formerly in Commission on Physicochemical Symbols, Terminology, and Units
<i>Denmark</i>	Prof. J. A. CHRISTIANSEN (28 July 1969)—Formerly in Commission on Physicochemical Symbols, Terminology, and Units
<i>Germany</i>	Prof. C. SCHÖPF (17 December 1970)—Formerly in Organic Chemistry Division Committee Prof. O. WARBURG (1 August 1970)—German Delegation to XIIth IUPAC Conference (1936)
<i>Switzerland</i>	Prof. P. KARRER (18 June 1971)—Former President of Organic Chemistry Division
<i>UAR</i>	Prof. A. R. TOURKY (16 January 1971)—Formerly in Bureau
<i>UK</i>	Prof. E. A. GUGGENHEIM (9 August 1970)—Formerly in Commission on Physicochemical Symbols, Terminology, and Units
<i>USA</i>	Prof. R. ADAMS (6 July 1971)—Former Vice-President

## NEW DEFINITIVE NOMENCLATURE RECOMMENDATIONS

The following definitive (final) nomenclature recommendations have been issued recently by IUPAC:

Manual of Symbols and Terminology for Physicochemical Quantities and Units

1970. 44 pages. \$3.00 (£1.00)

Nomenclature of Organic Chemistry, Sections A, B, & C—Combined Edition

1971. xiv + 338 pages. \$24.00 (£8.00)

Nomenclature of Inorganic Chemistry—2nd Edition

1971. xii + 110 pages. \$8.25 (£2.75)

Copies may be purchased from:

Butterworth & Co. (Publishers) Ltd.  
88 Kingsway  
London WC2B 6AB, UK



## REVISION OF ATOMIC WEIGHT VALUES

On the basis of work published or accepted for publication during the last two years, the following changes in atomic weight values were recommended by the Commission on Atomic Weights during the XXVIth IUPAC Conference:

<i>Chemical Symbol</i>	<i>1969 Atomic Weight</i>	<i>1971 Atomic Weight</i>
H	1.008 <sub>0</sub>	1.0079
F	18.9984	18.99840
Na	22.9898	22.98977
Al	26.9815	26.98154
P	30.9738	30.97376
K	39.10 <sub>2</sub>	39.09 <sub>8</sub>
Zn	65.3 <sub>7</sub>	65.38
Cs	132.9055	132.9054
Ho	164.9303	164.9304
Bi	208.9806	208.9804

The above values are considered reliable to  $\pm 1$  in the last digit or  $\pm 3$  if that digit is a subscript.

The full 1971 Report of the Commission will be published early in 1972 in *Pure and Applied Chemistry*.

# CALENDAR OF IUPAC-SPONSORED MEETINGS

1972

February 6-12	VIIIth International Symposium on Chemistry of Natural Products (Prof. S. RANGASWAMI, Secretary of Symposium Committee, VIIIth International Symposium on Natural Products, Indian National Science Academy, Bahadur Shah Zafar Marg, New Delhi-1, India)	New Delhi (India)
March 19-25	IVth International Fermentation Symposium (Executive Secretary of Organizing Committee, IVth International Fermentation Symposium, c/o Department of Fermentation Technology, Osaka University, Yamada-Kami, Suita-shi, Osaka 565, Japan)	Kyoto (Japan)
April 3-7	International Congress on Analytical Chemistry (Prof. T. FUJINAGA, Organizing Committee, International Congress on Analytical Chemistry, Kyoto International Conference Hall, Takaraike, Sakyo-ku, Kyoto 660, Japan)	Kyoto (Japan)
June 5-8	IUPAC-EUCEPA Symposium on Man-made Polymers in Papermaking (Mr. L. NEIMO, Executive Secretary, IUPAC-EUCEPA Symposium on Man-made Polymers in Papermaking, c/o Finnish Pulp and Paper Research Institute, POB 10136, Helsinki, Finland)	Helsinki (Finland)
June 10-15	Microsymposium on Photochemical Processes in Polymer Chemistry (Prof. G. SMETS, Laboratoire de Chimie macromoléculaire, Université de Louvain, Celestijnenlaan 200 F, B-3030 Heverlee, Belgium)	Louvain (Belgium)
June 22-28	XIVth International Conference on Coordination Chemistry (Dr. C. J. L. LOCK, Chairman of Organizing Committee, XIVth International Conference on Coordination Chemistry, c/o Department of Chemistry, McMaster University, Senior Sciences Complex, Hamilton, Ontario, Canada)	Toronto (Canada)
July 2-8	International Symposium on Macromolecules (Dr. J. LARINKARI, Federation of Finnish Chemical Industry, POB 13028, 00130 Helsinki 13, Finland)	Helsinki (Finland)
July 3-8	Symposium on Chemistry in Evolution and Systematics (Dr. J. B. HARBORNE, Secretary of Organizing Committee, Symposium on Chemistry in Evolution and Systematics, c/o Phytochemical Unit, Department of Botany, University of Reading, London Road, Reading RG1 5AQ, UK)	Strasbourg (France)
July 16-22	IVth IUPAC International Photochemistry Symposium (Prof. H. E. ZIMMERMAN, Department of Chemistry, University of Wisconsin, 1101 University Avenue, Madison, Wisconsin 53706, USA)	Karlsruhe (Germany)
July 17-21	VIIth International Symposium on Reactivity of Solids (Dr. R. M. DELL, Executive Secretary, VIIth ISRS, c/o Building 220, Atomic Energy Research Establishment, Harwell, Didcot, Berkshire, UK)	Bristol (UK)

August 14-18 or 21-25	VIIth International Symposium on Carbohydrate Chemistry (Prof. L. ANDERSON, Secretary of Organizing Committee, VIth International Symposium on Carbohydrate Chemistry, Department of Biochemistry, University of Wisconsin, Madison, Wisconsin 53706, USA)	Madison Wisconsin (USA)
August 21-25	Vth International Congress on Catalysis (Dr. V. HAENSEL, Chairman of Organizing Committee, Vth International Congress on Catalysis, c/o Universal Oil Products Co., Algonquin Road, Des Plaines, Illinois, USA)	Miami Beach Florida (USA)
August 28-31	Xth Prague Microsymposium on Macromolecules: Conformational Structure of Polymers (Microsymposium Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Petřiny 1888, Praha 6, Czechoslovakia)	Prague (Czechoslovakia)
August 28- September 1	Ist International Symposium on Advances in Microbial Engineering (Dr. Z. ŠTĚRBÁČEK, Secretary of Organizing Committee, Symposium on Advances in Microbial Engineering, c/o Institute of Microbiology, Czechoslovak Academy of Sciences, Budějovická 1083, Praha 4-Krč, Czechoslovakia)	Marienbad (Czechoslovakia)
September 4-7	XIth Prague Microsymposium on Macromolecules: Mechanism of Inhibition Process in Polymers (Microsymposium Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Petřiny 1888, Praha 6, Czechoslovakia)	Prague (Czechoslovakia)
September 4-7	IIIrd International Symposium on Carotenoids other than Vitamin A (Prof. C. BODEA, Chairman of Organizing Committee, IIIrd International Symposium on Carotenoids, Ministerul Invajamintului, Institutul Agronomic "Dr Petru Groza", Strada Mănăştur 3, Cluj, Romania)	Cluj (Romania)
September 4-8	Ist IUPAC Conference on Physical Organic Chemistry (Prof. H. ZOLLINGER, Department of Industrial and Engineering Chemistry, Eidgenössische Technische Hochschule, Universitätstrasse 6, CH-8006 Zürich, Switzerland)	Crans-sur-Sierre (Switzerland)
September 5-9	International Conference of Physical Chemistry (Prof. I. G. MURGULESCU, Centrul de Chimie Fizică, Ministerul Invăjămintului, Strada Galati 31, sectorul 2, Bucureşti 13, Romania)	Bucharest (Romania)
September 11-15	VIth International Congress on Surface Active Substances (General-Sekretariat des VI. Kongresses, Schweiz. Gesellschaft für Chemische Industrie, Nordstrasse 15, CH-8035 Zürich, Switzerland)	Zürich (Switzerland)
September 13-15	International Symposium on Medicinal Chemistry (Prof. P. PRATESI, President, Società Italiana Scienze Farmaceutiche, Via Giorgio Jan 18, I-20129 Milano, Italy)	Milan (Italy)
1973		
July 4-6	IVth International Wood Chemistry Symposium (Dr. D. W. CLAYTON, General Chairman, IVth International Wood Chemistry Symposium, c/o Pulp and Paper Research Institute of Canada, 570 St. John's Boulevard, Pointe Claire 720, Quebec, Canada)	Quebec (Canada)



	XXVIIth International Conference on Pure and Applied Chemistry (Executive Secretary, IUPAC Secretariat, 2/3 Pound Way, Cowley Centre, Oxford OX4 3YF, UK)	(Germany)
September 3-8	XXIVth International Congress on Pure and Applied Chemistry (Dr. W. FRITSCH, Gesellschaft Deutscher Chemiker, Carl-Bosch-Haus, Varrentrappstrasse 40-42, Postfach 119075, D-6000 Frankfurt/Main W 13, Germany)	Hamburg (Germany)
September 10-14	International Symposium on Macromolecules (Dr. J. GIBSON, International Symposium on Macromolecules, c/o The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Aberdeen (UK)
1974		
March	IVth International Conference on Crystal Growth (Prof. R. R. HASIGUTI, Chairman of National Organizing Committee, ICCG-IV, c/o Department of Metallurgy and Materials Science, Faculty of Engineering, University of Tokyo, Bunkyo-ku, Tokyo, Japan)	Tokyo (Japan)

## CALENDAR OF NON-IUPAC MEETINGS

1972

April 10-14	Inaugural Annual Meeting of new Chemical Society and Royal Institute of Chemistry (Dr. J. GIBSON, The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Manchester (UK)
April 17-21	International Conference on Inner Shell Ionization Phenomena (Prof. J. M. PALMS, Department of Physics, Emory University, Atlanta, Georgia 30322, USA)	Atlanta Georgia (USA)
June 18-24	Vth International Conference on Water Pollution Research (Dr. J. H. DENYSSCHEN, POB 395, Pretoria, Republic of South Africa)	Jerusalem (Israel)
June 27-July 8	International Conference on Chemistry at Interfaces and IIIrd International Summer School on Chemistry of Solid-Liquid Interfaces (Dr. V. PRAVDIČ, Rudjer Boškovic Institute, POB 1016, 41001 Zagreb, Yugoslavia)	Rovinj (Yugoslavia)
August 27-September 7	IXth General Assembly and International Congress of International Union of Crystallography (Prof. Y. SAITO, Institute for Solid State Physics, University of Tokyo, Roppongi 7-chome, Minato-ku, Tokyo 106, Japan)	Kyoto (Japan)
September 15-19	Symposium on Chemical Engineering (Ministry of Education and Ministry of Chemical Industry, Bucharest, Romania)	Bucharest (Romania)
September	International Colloquium on Semiconducting Polymers (Ministry of Education, Romania Academy, and Ministry of Chemical Industry, Bucharest, Romania)	Jassy (Romania)
September 19-22	XXIIIrd Annual Meeting of Société de Chimie physique: Dynamic Aspects of Conformational Changes in Biological Macromolecules (Secrétaire Général, Société de Chimie physique, 10 rue Vauquelin, F-75 Paris 5e, France)	Orléans (France)

The International Union of Pure and Applied Chemistry (IUPAC) is an organization devoid of political affiliation or obligations, created and operated by chemists themselves on a voluntary basis. Its predecessor was the International Association of Chemical Societies, in the formation of which distinguished European chemists like WILHELM OSTWALD were prominent, and to which SOLVAY gave generous support. In its present form the Union came into being at a meeting in London in 1918 through the joint action of Sir WILLIAM POPE, then President of the Society of Chemical Industry, and PAUL KESTNER, then President of the Société de Chimie industrielle. It was formally constituted in June 1920 in Rome.

ASSOCIATION INTERNATIONALE DES SOCIÉTÉS CHIMIQUES Bruxelles 1913



Crossley Casares Wauters Crismer Auerbach Hoogewerff Petersen Bjerrum Billmann Mourelou Kurnakow Ogliastro  
Fichter Cohen Lowry Walden Jacobson Menozzi Behal Witt Hauser Marie  
Tschugaeff Van Laer Werner Guye Haller Ramsay Ostwald Paterno Hanriot Frankland



## XXIIIrd IUPAC CONGRESS

**Boston, Massachusetts: 25-30 July 1971**

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Selected lectures from the various symposia at the above Congress are now available as a series of supplements to the IUPAC journal *Pure and Applied Chemistry*:

Volume 1.	Applications of Quantum Mechanics to Organic Chemistry Intramolecular Rearrangements, Valence Isomerization, and Cycloaddition Photochemistry	424 pp. \$15.00 (£5.00)
Volume 2.	General Methods of Synthesis New Natural Product Syntheses Small Rings	344 pp. \$12.00 (£4.00)
Volume 3.	Medicinal Chemistry Insect Chemistry	138 pp. \$7.50 (£2.50)
Volume 4.	Short-lived Intermediates Free Radicals and Homolytic Mechanisms Ion Pair Processes	546 pp. \$18.00 (£6.00)
Volume 5.	Biosynthesis Mechanism of Enzyme Action	134 pp. \$7.50 (£2.50)
Volume 6.	Organo-transition Metal Chemistry Homogeneous Catalysis	300 pp. \$12.00 (£4.00)
Volume 7.	Spectroscopy in Structure Determination Advances in Conformational Analysis Synthesis and Conformation of Biopolymers	288 pp. \$12.00 (£4.00)
Volume 8.	Macromolecular Symposia	342 pp. \$12.00 (£4.00)

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These volumes may be ordered from:

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**INTERNATIONAL UNION OF PURE  
AND APPLIED CHEMISTRY**

**UNION INTERNATIONALE DE CHIMIE  
PURE ET APPLIQUÉE**

**INFORMATION BULLETIN  
NUMBERS 42/43**

**JULY 1972**

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International Union of Pure and Applied Chemistry  
1972



# INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

President	— Prof. J. BÉNARD (France)
Vice-President	— Prof. Sir HAROLD THOMPSON (UK)
Secretary General	— Dr. W. GALLAY (Canada)
Treasurer	— Prof. O. HORN (Germany)

## IUPAC INFORMATION BULLETIN

The Bulletin provides a news medium for the various activities of IUPAC, especially of chemical topics which need regulation, standardization or codification. It includes details of forthcoming international symposia which are to be sponsored by IUPAC together with reports of such meetings which have recently taken place.

In 1972 there will be two issues of the Bulletin (Nos. 42/43 and 44) at an annual subscription of US \$2.50 (£1.00) with the option of an airmail subscription at US \$5.00 (£2.00). Subscribers will also receive the two series of Appendices to the Bulletin.

At the beginning of the second session of the Finance Committee meeting held in Zürich on 17 February 1972, a small presentation was made in honour of Dr. RUDOLF MORF, who at the XXVI IUPAC Conference (1971) had ceased to be Secretary General after 16 years in that Office.

On this occasion Prof. BÉNARD, President of IUPAC, presented Dr. MORF with a silver dish on which were inscribed the signatures of all living Past-Presidents of the Union: Prof. W. A. NOYES, JR., Lord TODD, Prof. W. KLEMM, Prof. V. N. KONDRATIEV, Dr. A. L. G. REES, Prof. J. BÉNARD.

Prof. BÉNARD recalled the eminent services rendered by Dr. MORF to IUPAC and expressed the gratitude of the whole international community of chemists.



Dr. MORF (on left) opens the box containing the silver dish while Prof. BÉNARD looks on



## **XXVII IUPAC CONFERENCE**

**Germany, 1973**

At its meeting in Washington, DC, during July 1971, the IUPAC Council resolved that the location of Hamburg and timing of the XXVII Conference should be carefully reviewed in an effort to reduce the cost to the Union.

In February 1972 at a meeting in Paris, the IUPAC Executive Committee considered data on various alternative locations to Hamburg. A final recommendation on location will be made shortly by the Treasurer—either Hamburg or Munich.

Meanwhile, the Executive Committee has decided to continue the tradition of holding Conference immediately before the IUPAC Congress. Members of all IUPAC bodies should, therefore, reserve the following period—23 August–1 September 1973—on the basis of a similar programme to that for the 1971 Conference.

Full details regarding the Conference programme and arrangements for travel and accommodation will be circulated later this year.

## REPORTS OF IUPAC BODIES

### IUPAC-IUB COMMISSION ON BIOCHEMICAL NOMENCLATURE (CBN)

Menton, 4-7 July 1971

*Present:* Prof. O. HOFFMANN-OSTENHOF (Chairman), Dr. W. E. COHN (Secretary), Prof. A. E. BRAUNSTEIN, Prof. P. KARLSON, Dr. B. KEIL, Prof. W. KLYNE, Prof. C. LIÉBECQ, Prof. E. C. SLATER, Prof. E. C. WEBB, Prof. W. J. WHELAN, Prof. S. VEIBEL, Dr. K. L. LOENING, and Dr. R. DYBKAER participated as Observers from the Commissions on Nomenclature of Organic Chemistry, on Macromolecular Nomenclature, and on Quantities and Units in Clinical Chemistry, respectively.

The first two days were occupied by a detailed discussion and wording of the several chapters making up the text of the revision of the 1964 edition of *Enzyme Nomenclature*. These included: historical introduction; classification and principles of enzyme nomenclature; designation of multiple forms and precursors of enzymes; units of enzyme activity; symbols of enzyme kinetics; nomenclature of coenzymes; nomenclature of electron-transferring proteins; and individual items involved in the actual tabular listing itself (headings, numbering, naming of phosphorus compounds involved in the light of the forthcoming D-rules, abbreviations, nomenclature for inter-convertible enzymes, and a few specific items not yet considered). Among the more significant decisions taken were to introduce the *katal* as the unit of enzyme activity in place of the old *enzyme unit* (the *katal* being based on moles transformed per second) and to use *rate* for the older *velocity*. Also, for the first time, a logical and systematic organization of peptidases was evolved and would be included.

It was hoped that the new edition of *Enzyme Nomenclature* would be printed as a separate volume, sponsored jointly by IUPAC and IUB, in late 1972.

The third day of the meeting was devoted to discussions and actions on the following subjects:-

Biochemical phosphorus nomenclature: a document would be prepared indicating systematic (D-rule) and trivial (biochemical) names of biochemically-important phosphorus-containing compounds. The most significant elements of this would be abandonment of phosphoryl and permission to use *phospho* as prefix in place of *O-phosphono* in biochemical papers.

Conformation designation systems for polynucleotides and polysaccharides: these would follow the previously completed polypeptide document (published as Tentative Nomenclature Appendix No. 10 to IUPAC *Information Bulletin*, February 1971). Committees had been constituted for each of these subjects.

Symbols for amino-acid derivatives and peptides: final approval was given to several of the new items included in this revision of the 1965 tentative document. Among the new items incorporated were the avoidance of D for di, and T for tri and tetra, and the introduction of symbols for several *ad hoc* abbreviations of the previous version, also the introduction of a trivial nomenclature for the *N*-methylhistidines.

Polymerized amino acids: a revision of the 1967 tentative document, to make it conform with the principles set out by the Commission on Macromolecular Nomenclature, was approved.

Vitamins and related compounds: several changes, made necessary by advances in the respective fields, were considered. Amendments or revised documents were under way.

Cyclitols: a definitive document was being prepared jointly with the Commission on Nomenclature of Organic Chemistry.

Steroids: several amendments to the 1968 tentative document were being evolved jointly with the Commission on Nomenclature of Organic Chemistry.

Carotenoids: the tentative document prepared jointly with the Commission on Nomenclature of Organic Chemistry was ready for publication.

Carbohydrates: Further work in this area (branched-chain and unsaturated sugars, polysaccharides, *etc.*) was under way.

Peptide hormones, iron-sulfur proteins, and tetrapyrroles: nomenclature documents were still in developmental stages.

A change in Membership took place. Prof. SLATER, incoming Treasurer of IUB, resigned and Prof. B. L. HORECKER was nominated in his place. Prof. KLYNE would be nominated as a Titular Member of the Commission on Nomenclature of Organic Chemistry while remaining on CBN, thereby assuring close contact between the two Commissions.

On the Fourth day CBN met jointly with the IUB Commission of Editors of Biochemical Journals for discussion of mutual affairs.

W. E. COHN

## **COMMISSION ON EQUILIBRIUM DATA**

**Washington, DC, 15-16 July 1971**

*Present:* Prof. D. N. HUME (Chairman), Dr. F. J. C. ROSSOTTI (Secretary), Prof. G. ANDEREGG, Prof. M. T. BECK, Prof. G. BIEDERMANN, Prof. A. S. KERTES, Prof. Y. MARCUS, Prof. L. B. ROGERS (Titular Members); Prof. S. BRUCKENSTEIN, Prof. H. FREISER, Prof. D. L. LEUSSING, Prof. G. H. NANCOLLAS, Dr. D. D. PERRIN, Prof. K. YAMASAKI (Associate Members).

### **Inorganic Stability Constants**

Dr. E. HÖGFELDT (Sweden) had been appointed project leader. A network of collaborators had been formed to cover current literature, data collection, and editing procedure. Work was already under way and the expected completion date was 1975/6.

### **Organic Stability Constants**

The project leader was Dr. PERRIN and a similar network to that of Dr. HÖGFELDT had been formed. It was agreed that copies of Supplement No. 1 to *Stability Constants of Metal-ion Complexes* should be requested from the Chemical Society (London) for members of both project groups.

### **Equilibrium Constants of Liquid-liquid Distribution Reactions**

(a) Part 1 of the above publication, organophosphorus extractants, had been submitted for approval. It was agreed that subject to a few minor alterations by Prof. MARCUS this could now go forward for consideration by the Division Committee.

(b) First sets of data on chelating extractants had been submitted for circulation. It was agreed that Prof. FREISER should consult Dr. STARÝ as to the future programme and for a tentative time schedule.



(c) Prof. MARCUS proposed to have the final version of alkyl-amine extractants ready by the end of 1971. Furthermore, he hoped to have the tables on oxygenated extractants ready for discussion at the meeting in Toronto in June 1972.

### **Critical Surveys of Solution Equilibrium Constants**

(a) Subject to minor revision, the introductory chapter by Prof. BECK was approved. The final version was to be submitted by the end of 1971.

(b) The chapter on cyanide-complexes would be submitted by Prof. BECK during November 1971.

(c) A revised version of the chapter on EDTA complexes would be submitted by Prof. ANDEREGG during November 1971.

(d) A draft manuscript on standard ionic media was approved in principle. Comments were to be forwarded to Prof. BIEDERMANN by 30 September 1971, in order that a revised version could be circulated by mid-November 1971.

(e) The manuscripts on gold and on halide complexes had not yet been received from Prof. YATZIMIRSKII. Dr. ROSSOTTI was asked to write to him suggesting that the manuscripts might be translated into English through the Secretariat.

Prof. MARCUS was preparing a critical survey of liquid-liquid distribution data for phosphorous-containing extractants which should be available for circulation to the Commission in November 1971.

(f) All chapters except possibly those from USSR should be ready for submission to the Division Committee in January 1972.

It was agreed that further suggestions for topics and authors should be discussed at the next meeting.

### **Data Retrieval**

It was agreed that the proposal from Prof. LEUSSING to flag abstracts be submitted to the Division Committee for consideration.

### **Nomenclature and Symbols**

A project group, composed of Dr. ROSSOTTI (project leader), Prof. BIEDERMANN, and Prof. NANCOLLAS, was asked to prepare a report on nomenclature and symbols of stability constants dealing in particular with conditional constants and mixed ligand constants. This report should be available for discussion at the next meeting.

### **Ion-exchange equilibrium Constants**

The Commission agreed that the draft report prepared by Prof. MARCUS, which had been discussed at earlier meetings, should be updated before the 1972 meeting. Prof. NANCOLLAS would assist Prof. MARCUS with this revision.

### **Nonaqueous Equilibrium Data**

Prof. BRUCKENSTEIN agreed to investigate and prepare a report on the status of work in this field. In particular he would advise on the necessity and feasibility of the Commission undertaking further work. On the basis of this report a decision would be taken at Toronto 1972 on whether to continue the project.

## **Solubility Data Project**

A project group (Prof. KERTES, Prof. HUME, and Dr. ROSSOTTI) would establish the need for Commission activity on this subject. The report would be discussed at the next meeting and a recommendation made on whether or not to continue the project.

## **Membership**

In view of his work on the Stability Constants Project it was agreed to nominate Dr. E. HÖGFELDT as a Titular Member. Prof. YU. A. ZOLOTOV was nominated as an Associate Member to assist in the projects on Liquid-liquid Distribution and Solubility Data.

## **Date and Place of Next Meeting**

It was agreed to hold a meeting during the XIV International Conference on Coordination Chemistry (Toronto, 22-28 June 1972).

D. N. HUME

## **COMMISSION ON AUTOMATION OF SECTION ON CLINICAL CHEMISTRY**

**Washington, DC, 15-17 July 1971**

*Present:* Prof. T. P. WHITEHEAD (Chairman), Dr. K. JØRGENSEN, Dr. M. C. SANZ.

## **Recommended Nomenclature for Automatic Analysis**

Part of the discussions were held jointly with the Commission on Analytical Nomenclature of the Analytical Chemistry Division. It was decided that further work on terminology should be carried out as a joint project of the two Commissions.

The Clinical Chemistry Commission presented a glossary, circulated by Dr. SANZ after its previous meeting (see *Information Bulletin* No. 41, November 1971, p. 13), in a slightly modified form. As far as possible it adhered to the *Recommended Terminology for Automatic Analysis* already published by the Commission on Analytical Nomenclature. In some cases modifications were agreed upon and some terms were merely discussed.

There was some disagreement whether one should try to define only a few basic concepts or whether one should try to define as many (basic and derived) terms as analysts would find useful in daily work. It was agreed that an extended nomenclature for automated analysis should take into consideration analog nomenclature from electronics, electronic data processing, and cybernetics.

## **Report on Automated Analysis**

Although this work did not progress very far, some aspects of electronic data processing of special interest to the Commission were discussed thoroughly.

K. JØRGENSEN

# INTERDIVISIONAL COMMITTEE ON MACHINE DOCUMENTATION IN THE CHEMICAL FIELD

Washington, DC, 16 and 20 July 1971

*Present:* Prof. J. E. DUBOIS (Chairman), Dr. J. W. BARRETT, Prof. G. B. BOKII, Dr. J. B. VAN EYK VON VOORTHUYSEN, Dr. C. SUHR, Dr. F. A. TATE, Dr. M. WILLIAMS / Mr. R. J. M. RATCLIFFE.

## Introduction

In a brief historical introduction, Prof. DUBOIS covered the background to the appointment of the Interdivisional Committee and its inaugural meeting at Frankfurt (27-28 April 1970). The Executive Committee had subsequently directed that the terms of reference of the Interdivisional Committee should be restricted to Recommendations A and B of the report presented by Dr. B. RIEGEL to the Bureau at Cortina d'Ampezzo in 1969 (see *Information Bulletin* No. 36, November 1969, pp. 27-30).

## Finalization of Agenda

Prior to the meeting Prof. DUBOIS had circulated the following documents:

- DOC LCOP 108 — Model Information Flow Sheet and Documentation Centres
- DOC LCOP 109 — Process Functions
- DOC LCOP 109b — Glossary
- DOC LCOP 110 — Proposal for Minimal Requirements for Machine Handling of Chemical Structures

Comments had been submitted to him in letters from Drs. BARRETT, R. N. JONES, SUHR, and TATE. The comments of Prof. BOKII were available only at the meeting.

There was general agreement that, in view of the Executive Committee directive, documents 108, 109, and 109b should not be considered further. However, document 110 formed a starting point for work on Recommendation B of the Riegel-Report: 'The first task . . . should be directed towards the machine handling of chemical structures and the computer generation of nomenclature.'

## Machine Handling of Chemical Structures and Computer Generation of Nomenclature

Dr. TATE commented that document 110 implied an intention for the Interdivisional Committee to create a new nomenclature language. Existing IUPAC nomenclature recommendations were certainly not all suitable for machine handling. As a longterm aim the automatic generation of names (nomenclature) from structures by the computer was required, rather than the reverse. More immediately, however, IUPAC Nomenclature Commissions should be asked to modify their working procedures for easier computer use. It was agreed that formulation of nomenclature for machine-handling only, should be avoided, otherwise many chemists would be unable to use it. The function of the Interdivisional Committee was to suggest principles required for computer handling and not actual nomenclature.

The Interdivisional Committee should attempt to identify the inconsistencies in established and proposed IUPAC nomenclature recommendations



which made difficult the efficient use of computer-based systems for automatically generating and handling such nomenclature and equivalent diagrammatic representations. Dr. TATE agreed that Chemical Abstracts Service (CAS) would prepare a paper on this subject for circulation within the Committee and subsequent discussion at a meeting with the Chairman of IUPAC Nomenclature Commissions. Furthermore, CAS would assemble data on the use of nonsystematic names in IUPAC nomenclature recommendations. Dr. SUHR agreed to prepare a paper to illustrate the shortcomings of Markush formulae.

The amplification of Recommendation B in the Riegel-Report was discussed in detail and agreement reached on the following interpretation:

'There is a real need for a unique definition of chemical structure in natural language which is understandable on the printed page and yet logical and unambiguous to a computer program. The natural language representation of each structure must have a unique positioning in any organized list. The original system must be well designed so that it will not be necessary to make *continuous* changes.'

Seven guidelines had been listed in the Riegel-Report for fulfilment of Recommendation B. Furthermore, an eighth guideline was added to the seven guidelines of Recommendation B:

8. Simplified, consistent description (2 D and 3 D) of stereochemistry.

Several Members agreed to set up working material:

- (a) Dr. TATE would prepare a paper illustrating each guideline.
- (b) Dr. SUHR would also prepare a paper touching on some of the guidelines, particularly the problems of cyclic nuclei. The latter subject was being studied in depth by CAS and Dr. TATE would also be able to supply information in due course.
- (c) CAS should also be able to supply data based on its operational experience in using computer-programmed conversion of *Chemical Abstracts* index names into the corresponding machine cipher derived by programme from structural diagrams recorded in computer-readable form.

### **New IUPAC Tentative Nomenclature Recommendations**

In order to collaborate effectively with the IUPAC Nomenclature Commissions it was suggested that, rather than receive approved manuscripts ready for publication, the Committee might see new tentative nomenclature recommendations at an early stage during their preparation. This possibility should be discussed at a meeting with the Chairmen of Nomenclature Commissions. Meanwhile, in conjunction with these Commissions, the Secretariat should prepare a listing of all nomenclature programmes (extended titles) in hand and planned, for consideration at the next meeting of the Committee.

### **Membership**

It was decided to recommend to the Bureau that Prof. S. FUJIWARA (Japan) be made a Member of the Committee. His two papers:

Syntactical Proximity: Partial Syntactical Analysis of Natural Language Data Records

General Updating and History of a Scientific Literature Data Base by Conversational Input

would be discussed at the next meeting of the Committee. A third paper:

#### First Report of the Committee of Information Science

would be translated from the Japanese and circulated by Dr. TATE. In this respect, each Member would keep the Committee fully informed of developments in his own country.

### Symposium

The possibility of sponsoring a small colloquium in 1973 or 1974 would be investigated. The need to cooperate with other IUPAC bodies was stressed.

### Date and Place of Next Meeting

Allowance had been made in the 1972 IUPAC budget estimate for two meetings:

1. Paris—16-17 May,
2. Columbus/Ohio—second or third week in October.

J. E. DUBOIS

## SECTION ON PESTICIDES

Washington, DC, 15-20 July 1971

*Present:* Dr. H. HURTIG (Chairman), Dr. CH. RESNICK (Secretary), Dr. D. C. ABBOTT, Mr. J. W. COOK, Dr. H. FREHSE, Dr. R. A. E. GALLEY, Dr. K. R. HILL, Dr. G. L. SUTHERLAND, Prof. G. WIDMARK.

### International Liaison

(a) *FAO/WHO*. The Chairman summarized the overall work of the Section and its two Commissions in meeting the FAO-WHO Joint Meeting on Pesticide Residues (JMPR) requirements for methods of residue analysis and metabolic studies. In the discussion which ensued, Members again made it clear that the nonavailability in sufficient time of the JMPR Monographs made it very difficult for the Section to initiate and guide the necessary work to meet adequately the JMPR requirements. They expressed the opinion that the interest of JMPR would be served best if the actual draft working papers for each pesticide discussed by JMPR could be made available to the Section at an early date.

It was resolved that the request of the Section to make the Monographs available in sufficient time to the Section be brought again to the attention of FAO and WHO. It was also decided that the Chairman should explore with the FAO Secretariat of JMPR the possibility of making copies of the draft working papers available to the Section.

(b) *ICSU/SCOPE*. The Section discussed the principles laid down by the Commission on Monitoring on methods of analysis, and agreed that two important principles in the development of methods of analysis for monitoring purposes were the following:

- i. The methods developed should, as far as possible, not require expensive equipment.
- ii. The methods selected should be the most suitable for solving the given problem.

(c) *OECD*. Dr. HURTIG reported on OECD's intentions of carrying out studies on the presence and effects of PCB's, mercury, and cadmium. Further

discussions on OECD's work were referred to the two Commissions of the Section.

(d) *CEE*. The Section noted with satisfaction the promising liaison already existing with the CEE work on development of methods of analysis for pesticide residues. In discussing the future of this liaison, the Section rejected the principle of an official contract between IUPAC and CEE in the pesticide residue chemistry field.

(e) *Codex Committee on Pesticide Residues*. The Section discussed ways and means by which it could best serve CCPR requirements for methods of analysis. It decided to refer the matter to the Chairman of the Commission on Pesticide Residue Analysis, who should discuss this with Dr. E. TURTLE of FAO and propose a mechanism for serving CCPR, possibly via JMPR, and present his proposals at the next meeting of the Section.

(f) *AOAC*. (Dr. W. HOROWITZ and Mr. ENSMINGER present). The Representatives of AOAC had requested to appear before the Section and were invited to do so. They stated that AOAC was interested in establishing close cooperation between AOAC and the Pesticides Section of IUPAC. They reviewed the history and development of AOAC and emphasized the international nature which AOAC had assumed as from 1970, whereby associate referees for methods of analysis were drawn from many countries around the world and not only from USA. AOAC did not depend only on one analytical method for solving a given problem, and a mechanism for validating analytical methods had existed within AOAC for more than 90 years. AOAC was of the opinion that liaison and cooperation with the Pesticides Section would greatly benefit both organizations, contribute to knowledge in the methodology of pesticide residue analysis, and lead to a better understanding and communication among chemists working in the field of pesticide chemistry.

The Chairman explained the mechanism of operation of the Section and its two Commissions, and outlined the scope of its work to meet the growing need for authoritative scientific knowledge on methods of analysis and the nature of terminal pesticide residues. He emphasized the consultative status of the Section and its two Commissions, and the cooperation which already existed with leading international organizations.

In the lively discussion which ensued it was the concensus of opinion of the Section Membership that liaison with AOAC would be desirable and mention was made of the importance of AOAC studies in the work of the Section.

It was suggested that the Commission on Pesticide Residue Analysis should discuss an AOAC draft paper on definitions of some basic terms during the present meeting and should consider other definitions for comment and discussion at the next meeting.

The whole subject of the nature of future cooperation with AOAC would be discussed in the next meeting of the Section and an official reply to AOAC drafted.

### **Membership**

(a) The Chairman offered words of thanks to Drs. GALLEY and SUTHERLAND, whose Titular Membership terms expired in 1971, for their excellent service and dedicated work.

(b) The Section decided to recommend to the Bureau the nomination of Dr. ABBOTT as Chairman of the Section and of the Commission on Pesticide Residue Analysis and Dr. P. SLADE (UK) as Secretary.



(c) The Section decided on future Membership of the Section and its two Commissions and handed its recommendations officially to the President of the Applied Chemistry Division for approval by the Bureau.

(d) The Section passed a vote of thanks to Dr. HURTIG for his service as Chairman of the Section and his inspired guidance to its Members.

### **National Representatives**

The Section discussed the question of National Representatives to the Section. It was decided that since the Section's work was being fully recognized, nationally and internationally, the Section was not ready to accommodate at the present time any National Representatives.

### **II International Congress on Pesticide Chemistry**

Drs. HURTIG and RESNICK reported on this Congress and on the Symposium on Pesticide Terminal Residues, both held in Tel-Aviv in February 1971. [Editorial Note: see also p. 30 of this Bulletin and *Information Bulletin* No. 40, June 1971, p. 77.]

### **III International Congress on Pesticide Chemistry**

The Section discussed the subjects and topics of the III Congress to be held in Helsinki in 1974.

### **IV International Congress on Pesticide Chemistry**

(a) The Section decided to invite suggestions for a host country for the IV Congress due to be held in 1978.

(b) Spain was proposed for a Symposium in 1976, the topic to be discussed and approved at the next Meeting of the Section.

### **Miscellaneous**

(a) *UN Conference on 'Man and His Environment'*. The Chairman described some aspects of the preparatory work towards this UN Conference which would be held in Stockholm in 1972, and expressed his concern that the type of work proposed might not receive UN funds. He stressed the need of the Section to provide basic information on pesticide chemistry not only with regard to food, but also to many other aspects of controversial opinion on the chemical quality of the environment. He reported that the President of the Division had proposed to the Bureau the establishment of an *ad hoc* IUPAC Committee to study the behaviour of chemicals in the environment.

(b) *Relations between the Chemist and the Public*. Prof. WIDMARK introduced a draft paper entitled *Improving Communication between the Chemist and the Public on Environmental Matters*. Prof. WIDMARK requested the Section to offer comments on the paper before its publication.

(c) *Public Relations*. Dr. FREHSE raised the point that more publicity should be given to the general public, via various media, on IUPAC activities, including the Section's major contribution to the much discussed field of pesticide chemistry. It was decided to present this opinion in the form of an official letter of the Section to the President of the Division for consideration.

[Editorial Note: for reports on the meetings of the Commissions on Terminal Pesticide Residues and on Pesticide Residue Analysis, held simultaneously with that of the Section on Pesticides, see *Comptes Rendus XXVI Conference*, pp. 225 and 247.]

CH. RESNICK

# IUPAC-IUB COMMISSION ON BIOCHEMICAL NOMENCLATURE (CBN)

Miami, 16-20 January 1972

*Present:* Prof. O. HOFFMANN-OSTENHOF (Chairman), Dr. W. E. COHN (Secretary), Prof. B. L. HORECKER, Prof. P. KARLSON, Dr. B. KEIL, Prof. W. KLYNE, Prof. C. LIÉBECQ, Prof. E. C. WEBB, Prof. W. J. WHELAN. Dr. K. L. LOENING participated as an Observer from the Commission on Macromolecular Nomenclature and Profs. W. B. JAKOBY and E. C. SLATER as experts on enzyme nomenclature.

The first four days were devoted to intensive work on CBN's present major undertaking, the revision and expansion of the 1964 edition of *Enzyme Nomenclature*. The work on the new edition consisted principally in (a) a detailed review of each of the several hundred entries in the fourth and penultimate draft of the book, with respect to the reaction, names, comments, and references for each, and (b) a review and revision of each of the several chapters that preface the actual entries. Many, if not most, of the entries were revised to accommodate the newer information at hand, and some of the chapters were rewritten by subcommittees between sessions. With the receipt of two new sections, it is believed that a final version could be produced within 1972.

It was proposed that the final draft be produced in a form suitable for photographic reproduction, to save time in producing the book, to reduce the number of errors that would certainly arise in typesetting the complicated document, and to reduce the cost to the purchasers and thus increase its distribution.

Apart from the work on *Enzyme Nomenclature*, CBN considered the following:-

1. Documents in press: Carotenoids (prepared jointly with the Commission on Nomenclature of Organic Chemistry, CNOC); Multiple Forms of Enzymes; Symbols for Amino-acid Derivatives and Peptides; Polymerized Amino Acids.
2. Revision of existing tentative rules and recommendations:
  - (a) Steroids (joint with CNOC): amendments and corrections had been published in several journals and incorporated into a definitive version, which was in press in *Pure and Applied Chemistry*.
  - (b) Cyclitols (joint with CNOC): the Working Group still had some problems to resolve before a definitive version could be produced.
  - (c) Vitamin B<sub>6</sub>: amendments proposed by the original Working Group were being circulated to CBN for final approval, leading to a definitive version.
  - (d) One-letter Symbols for Amino-acid Sequences: no changes had been suggested and a definitive version could be published.
  - (e) Quinone Nomenclature: it was agreed that the deletion of System II and references thereto sufficed to bring this document to definitive publication.
  - (f) Corrinoids: an expanded and revised version was being compiled.
  - (g) Tocopherols: a new approach was necessary and this was under way.
  - (h) Carbohydrates-I: advancement to definitive publication would not take place until each Commission (CNOC and CBN) had had an opportunity to review all criticisms received.

3. Items in progress in the hands of Working Groups were: Tetrapyrroles; Conformations of Polysaccharides and Polynucleotides; Peptide Hormones; Amino-acid Nomenclature (a first draft in circulation); Carbohydrates-II (dealing with the nomenclature of classes of carbohydrates not yet covered in the first document); Biochemical Phosphorus Nomenclature (an outline had been agreed; also, that publication should not precede that of CNOC's D-rules); Iron-Sulfur Proteins (a proposed final draft was in circulation); Glycolipids (expanded to include sphinganes, gangliosides, *etc.*; a convenor was being sought); Nonenzyme Proteins (new); Cytochromes (new; a Working Group and a convenor had been appointed); Labelled Compounds (CBN approval of the CEBJ agreement was proposed).
4. Miscellaneous matters:
  - (a) The IUB Commission of Editors of Biochemical Journals (CEBJ) requested CBN's approval of its wish to have a compendium of existing biochemical nomenclature documents published. CBN approved the proposal in principle.
  - (b) The documents on Immunoglobulin Nomenclature, prepared by an outside (WHO) group and referred to CBN for criticism, would be published with acknowledgement that CBN had been consulted.

W. E. COHN

## FINANCE COMMITTEE

**Zurich, 17-18 February 1972**

*Present:* Dr. J. W. BARRETT (Chairman), Dr. E. M. BEAVERS, Mr. J. BROCARD, Prof. A. BJÖRKMAN, Dr. K. HOSHINO, Dr. R. MORF, Prof. O. HORN, Dr. M. WILLIAMS, Prof. J. BÉNARD (in part).

The following subjects were discussed in detail: Statement of Accounts for 1971, Revised Budgets for 1972 and 1973, Company Associates Scheme, Revised Dues Structure for National Adhering Organizations, Evaluation of Travel and Accommodation Arrangements for XXVI IUPAC Conference (1971), Guidelines for Minimizing Costs of Meetings, Additional Sources of Income for IUPAC. In order to improve the present poor financial situation of the Union, several recommendations were made for consideration by the Executive Committee.

The advice of Schweizerische Bankgesellschaft was sought concerning possible changes in the Union's investment portfolio for increasing the annual revenue over the next 2-3 years without affecting the long-term capital appreciation. The IUPAC Banker recommended specific actions to alter the pattern of the portfolio from 85% shares and 15% bonds to approximately 50% of each. These actions could be expected to raise the 1972 income from investments from the previous budget figure of \$7,000 to at least \$9,000. For 1973 a further rise in such revenue to not less than \$12,000 could be expected.

J. W. BARRETT



## SECTION ON ORGANIC COATINGS (OCS)

Teddington, 17-19 February 1972

*Present:* Mr. P. H. FINK-JENSEN (Chairman), Dr. J. A. W. VAN LAAR, Dr. L. A. O'NEILL, Mr. A. R. H. TAWN (Titular Members); Mr. G. CHRISTENSEN, Prof. K. HAMANN, Dr. K. M. OESTERLE, Mr. H. K. RAASCHOU NIELSEN, Dr. D. WAPLER (Associate Members); Dr. J. PETIT (National Representative).

### Opening Address by Chairman

The Chairman opened the meeting by briefly outlining the activities during the last meeting of the Section (see *Comptes Rendus XXVI Conference*, pp. 260-263). He recalled that in spite of his fight for continuation of the Section in the Applied Chemistry Division, it had been decided at the Council meeting that OCS could only retain its membership of the Division until the end of the XXVII IUPAC Conference (1973). During the interim period every effort should be made to explore other possibilities for incorporating the Section within the IUPAC structure. The Chairman, furthermore, reported that at a meeting of the Bureau in Washington the question of money for OCS during 1972 had been discussed. Towards the end of 1971 he had been informed by the President of the Division, Dr. CAIRNS, that it would be necessary to work out a completely new, very reduced budget. The Chairman had used this opportunity to suggest to Dr. CAIRNS that the revised budget might include an amount to cover reimbursement of expenses for the OCS meeting in 1972.

The Chairman then dealt shortly with the Washington meeting between the Macromolecular Division and OCS (see *Comptes Rendus XXVI Conference*, p. 169). The Macromolecular Division did not intend to establish Commissions or Sections based on industrial sectors but might consider Commissions on scientific activities. This was confirmed at a later date by the President of the Macromolecular Division, Prof. BENOIT, who in a letter had asked that a list be forwarded of such problems of the organic coatings industry which could be of interest for the Macromolecular Division. The Chairman had forwarded a preliminary reply to Prof. BENOIT and informed him that the question would be discussed at the present meeting of OCS. As a consequence of the letter from Prof. BENOIT, the Chairman had forwarded to the Members a questionnaire in which he asked for their opinion as to the desirability of OCS joining the Macromolecular Division and/or forming a nucleus for international cooperation between paint technologists. The majority of the Members found it difficult to reconcile the desired general orientation towards surface coatings with specific scientific activities.

Mr. FINK-JENSEN gave a short report on two meetings (Washington in July 1971 and Detroit in October 1971) with Officers of the Federation of Societies for Paint Technology (USA) and Members of the Liaison Committee of the Federation. The purpose of the meetings had been to discuss possible future cooperation between the Federation (and other associations) and OCS. The Chairman supplemented his report by informing the Members that after the Detroit meeting he had received from the Chairman of the Liaison Committee, Mr. F. K. DANIEL, a proposal for the formation of an 'International Co-ordinating Committee of the Coatings Industry' (ICCCI).

The situation about new Members and the present activities of OCS were reviewed.

The Chairman finally mentioned that he had been asked by the IUPAC Secretariat what contacts OCS had with ISO. Mr. FINK-JENSEN had indicated

the following memberships of OCS Members in ISO technical committees:

J. A. W. VAN LAAR	}	ISO/TC 35/SC 9 (Sub-Committee on General Test Methods for Paint and Varnishes)
U. ZORLL		
H. K. RAASCHOU NIELSEN		
L. A. O'NEILL	}	ISO/TC 35SC 10 (Sub-Committee on Test Methods for Paint Media)
J. PETIT		

### **Future of Organic Coatings Section (Discussion among Members)**

As OCS would no longer be a Section of the Applied Chemistry Division after the IUPAC Conference in 1973, the general future of OCS and especially its possible attachment to international or other organizations was discussed under the headings:

- (a) attachment to IUPAC Macromolecular Division
- (b) attachment to associations and federations of organic coatings chemists (Associations)
- (c) possibility of independent existence (Independence)

It was emphasized that none of these possibilities was considered to be mutually exclusive. It soon became apparent that whatever happened, the OCS Members present intended to continue as an international group working with scientific and technical problems of interest to the organic coatings field, *i.e.*, to work and deal with problems of the same character as before.

(i) *Macromolecular Division.* Because Prof. BENOIT, for discussion in the Macromolecular Division, needed 'propositions showing clearly the problems of the organic coating field which could be of interest for the Macromolecular Division . . .', a list of such topics was prepared. This list would comprise the main content of a reply to Prof. BENOIT. Several Members of the Section had been contacted by Members of the Macromolecular Division who had wanted to be informed about the viewpoints of the Section as to the preferred contact with the Macromolecular Division. The Members present agreed that if the Macromolecular Division could accept OCS on its terms as a Section it would be natural and desirable for the independent OCS to have contacts through appointment and participation of individual Members in existing and possible future Commissions or Sections of the Macromolecular Division.

(ii) *Associations.* Possible attachment of OCS to the Oil and Colour Chemists Association (OCCA) had, according to Mr. TAWN, been discussed in OCCA but it had been the consensus that it would be incorrect for OCS to join OCCA (or any other association). Furthermore, according to its statutes it would hardly be possible for OCCA to support OCS with money although maybe in other ways.

Possible connections to the Federation of Societies for Paint Technology was discussed in the light of a draft from its Liaison Committee: statement of the purpose and program of the 'International Coordinating Committee of the Coating Industry' (ICCCI). Amongst the Members (the relationship to ICCCI was discussed further under the next item) there was agreement that if OCS should fit as part of ICCCI, then it should be as a sort of technical scientific committee and probably nothing more.

(iii) *Independence.* The possibilities for existence as an independent group were discussed from organizational and economic points of view. An affiliation to IUPAC was considered desirable to keep an international status, but concurrently OCS could also instigate and maintain connections as an

independent group cooperating with the Applied Chemistry Division, Macromolecular Division, Associations, *Progress in Organic Coatings*, ISO, etc. Even if OCS continued only as a sort of international discussion group, travel expenses for the individual Members would not appear to be a large problem because many of the Members would meet anyway at congresses in connection with which it would be natural to arrange meetings.

### **Future of Organic Coatings Section (Discussion in an Enlarged Forum)**

*Present* (in addition to OCS Members): Mr. A. O. BRANTSETER (Federation of Scandinavian Paint and Varnish Technologists: SLF); Dr. P. HEIBERGER (Federation of Societies for Paint Technology: FSPT); Mr. A. RUDRAM and Mr. A. R. H. TAWN (Oil and Colour Chemists' Association: OCCA); Dr. J. PETIT (Fédération d'Associations de Techniciens des Industries des Peintures, Vernis, Emaux et Encres d'Imprimerie de l'Europe Continentale: FATIPEC); Dr. R. BULT (Verfinstituut TNO, Netherlands); Prof. W. FUNKE (*Progress in Organic Coatings*).

The Chairman gave a summary of the history of OCS, together with its present activities and explained the background of the present situation. He stressed the decision, made by the Members earlier in the present meeting, that OCS irrespective of what the future might bring, would continue as an international group dealing with paint science and technology at a high level.

Mr. FINK-JENSEN distributed and reviewed F. K. DANIEL's *Statement of Purpose and Program of the International Coordinating Committee of the Coatings Industry (ICCCI)* and his memorandum of 1 December 1971, and thus laid open to debate the possible accommodation of OCS into a future ICCCI.

Dr. HEIBERGER emphasized that the *Statement* was only the first draft from FSPT's Liaison Committee, i.e., a basis for discussion, even though the *Statement* represented the consensus of the majority of Members of the Liaison Committee. After a lengthy debate the conclusion was arrived at, that the present OCS would under all circumstances continue its activities and in doing this seek the closest possible connection with the Macromolecular Division of IUPAC; that it could perhaps after a necessary gradual enlargement over some years, change into the international Technical Committee which administratively was connected to the future ICCCI Council. It was visualized that such a Technical Committee should form study groups around particular themes. For practical reasons, they should preferably be regional.

The formation of the organizational structure of ICCCI, the Council of which might include, amongst others, representatives from FSPT, OCCA, FATIPEC, SLF, etc., was discussed. The formation of a planning group, which might involve OCS, was envisaged. Further discussion in connection with this was expected to take place in connection with the 1972 FATIPEC Congress.

The Chairman pointed out that if OCS was expanded it could, formally, no longer belong to IUPAC since its statutes only allowed 8 Titular Members, 8 Associate Members, and 1 National Representative per country. The Chairman, who would consider the situation together with the Secretary, would write a letter to Mr. DANIEL and also an informative letter to the absent Members of OCS asking for their viewpoints as to the decisions reached during the meeting.

The question of economy was raised but it was agreed that economic



considerations should not hinder the present discussions on international cooperation. The requirement for money could be raised when the need arose in connection with individual activities.

*Progress in Organic Coatings.* During the meeting Prof. FUNKE presented a status report on the journal *Progress in Organic Coatings* (discussed in earlier OCS meetings under 'Monograph Series'). The first issue would be published in March 1972 by Elsevier and include contributions from UK, USA, Germany, and Japan. The journal contained critical review articles. It had been drawn up with *Advances in Polymer Science* in mind and had a truly international board of editors.

The question of whether results of collaborative exercises carried out by OCS could be published in the journal was raised. Prof. FUNKE replied that they did not really fit into the picture today, but that it might be possible in the future.

### Present Activities of Organic Coatings Section

The Chairman reminded the meeting that copies of all important correspondence in connection with the individual activities should be sent to him and to the Secretary.

(i) *Assessment of Application Properties of Brushing Paints.* The report had been published in *Journal of Paint Technology* 43, 60 (1971). Five hundred reprints have been ordered and copies would be forwarded to the Members. The Chairman had suggested to the President of the Applied Chemistry Division that IUPAC paid for 250 reprints.

(ii) *Postgraduate Training.* Prof. HAMANN would prepare a short report on the basis of the—rather dissimilar—contributions received from Members. In this connection it was reported that an 'Industrial Training Board' for the advanced training of graduate chemists and technicians had been formed in Great Britain.

(iii) *Adhesion Project.* At the request of Dr. VAN LAAR it was decided that Members should forward to him a list (photocopy of 'Abbreviations of Titles of Journals' from *World Surface Coatings Abstracts*) indicating those journals from which they would be willing to send photocopies of relevant articles to him. The Members would be contacted by a circular letter from Dr. VAN LAAR. On the basis of the returned lists he would prepare and forward to the Members a list indicating the journals for which each individual OCS Member was to be responsible. Mr. TAWN indicated that many articles dealing with adhesion and relevant to the paint industry did not appear in paint magazines. Furthermore, he proposed that the adhesion of printing inks to synthetic materials, e.g., plastic foils, be dealt with in the proposed booklet. As far as the comprehensiveness of the publication was concerned it was decided to limit the contributions from Members to photocopies of new literature. Dr. VAN LAAR reported that he was to give a series of five lectures on 'Adhesion of Paints' and asked if it would be possible for him to use this material and thus make a compromise with the decision made in Cortina d'Ampezzo (1969). The Chairman stressed the importance of finalizing the booklet as soon as possible, but found it necessary to adhere essentially to the principal decisions made in Cortina.

(iv) *Information Retrieval.* Mr. RAASCHOU NIELSEN reported that so far he had received completed questionnaires from 18 of the organizations to which it had been forwarded. In order that the report might be truly representative it was decided that he should send Members a circular letter including a list of the organizations to which the questionnaire had so far been sent. Members would be asked to give supplementary information about other organizations

known to them as being actively engaged in documentation services pertaining to the surface coatings industry.

(v) *Analysis*. Dr. O'NEILL indicated that the report on *Analytical Methods for Alkyd Resins* had been sent to IUPAC for publication in an English and a French version. IUPAC had preferred only to publish the report in English. The attention of IUPAC should be drawn to the need for reprints in the form of booklets from *Pure and Applied Chemistry*. The Secretary would enquire whether the French translation, which had already been prepared and forwarded to IUPAC, might be published in an appropriate national journal(s). Dr. PETIT in conjunction with Mr. TOUSSAINT would revise the French translation so that it conformed in detail to the English version published by IUPAC.

Experimental work in conjunction with the analysis of acrylic resins had been concluded. Dr. O'NEILL had condensed the results into a short report which would be enlarged with a critical discussion of the methods employed and if possible a recommendation as to the most suitable methods. After this, IUPAC would be asked for permission to publish the report in a paint journal—there was a slight preference for *Journal of Oil and Colour Chemists Association*.

Experimental work in connection with the analysis of polyurethanes was expected to be concluded in the next 2-3 months. The results should be reported in the same way as for the acrylic resins.

Analysis of polyamide resins would be the next project that the subcommittee for analysis would undertake. The experimental work was expected to start in about 6 months.

Further subjects which might be considered when the future of the Section was more secure would be gel permeation chromatography and determination of reactive groups in amino resins.

(vi) *Symposium*. After a short discussion it was agreed that a symposium on pollution (working title *Prevention and Control of Pollution in the Paint Field*) would be preferable to earlier discussed subjects. Dr. BULT agreed to consider arranging this symposium but he had to obtain the necessary permission from TNO. Thereafter he would prepare a draft and attempt to organize the symposium in the spring of 1973. Mr. FINK-JENSEN asked that it should be attempted to arrange it as an IUPAC-sponsored symposium.

### **Membership**

Mr. TAWN was nominated as Vice-Chairman of the Section. Dr. H. SPOOR (Badische Anilin- und Soda Fabrik AG) had been proposed as the National Representative for Germany.

H. K. RAASHOU NIELSEN

## **ANALYTICAL CHEMISTRY DIVISION EXECUTIVE COMMITTEE**

**Kyoto, 4 and 6 April 1972**

*Present*: Prof. W. KEMULA (President), Prof. N. TANAKA (Vice-President), Mr. R. W. FENNELL (Secretary); Prof. H. FREISER and Prof. B. TRÉMILLON (in part).

### **Division Budget 1972**

The President explained that the Division Budget had twice been cut and

this necessitated a very critical review of the requests for expenditure. Already some Commissions had been advised to cancel or cut down expenses for Commission meetings. With the information available at the time, some further allocations were made for 1972.

### **Collaboration with ISO**

The Secretary outlined the actions being taken as a result of his report to the IUPAC Executive Committee following attendance at the 1971 plenary meeting of ISO/TC 47 in Milan. Draft ISO Recommendations were already being received for comment. A list of Division activities was almost complete and would be forwarded to the TC 47 Secretariat. A list of individual expertise in the Division was being compiled for the Secretariat.

Dr. W. I. STEPHEN's report on the TC 47/SC 3 meeting in London (13-14 January 1972) was considered. The Secretary agreed to write to Dr. STEPHEN to enquire whether he was agreeable to the report being forwarded as it stood to the IUPAC Executive Committee.

### **'External' Publications**

The paper prepared by the Secretary and the note from the IUPAC Executive Secretary were considered. It was agreed that no action was required in the cases of Commission V.1 reports to CEE or Commission V.6 reports on stability constants. The outstanding case was that of the polarographic data project of Commission V.5. It was agreed that the compilation and publication of the polarographic data cards by the Polarographic Society of Japan could not be considered a part of the Commission V.5 project because, although the compilation was of interest to Commission V.5, IUPAC was not actively concerned in the work and was not mentioned in the published material.

### **Rules and Statutes**

*Minutes of Meeting of ad hoc Committee on Statutes and Bylaws.* It was agreed that the Secretary should write to the Secretariat replying to the criticism of the method of electing the Division Secretary and explaining the advantages of the zonal representation for elections to the Division Committee.

*Election of Division President-Elect.* It was agreed after discussion that the revised Rule 1.108 was sufficiently exact for the general Rules. The exact details for the election of the next President-Elect (to take office in 1975) would be settled at the IUPAC Conference in 1973.

*New Report Record Forms.* The Secretary reported that those Commission Chairmen who had replied to his enquiry on the proposed new forms had been in favour of their introduction. It was agreed that the Secretary should seek the approval of the Division Committee to alterations in the Division Rules necessary to cover the use of the new forms.

### **Programme of the Division**

*Reports Published and in Approval Stage.* The Secretary reported that five reports from Commission V.5 and two from Commission V.7 had been published in *Pure and Applied Chemistry* since the XXVI IUPAC Conference in Washington. One report from Commission V.2 was still in press. Five tentative nomenclature reports from Commission V.3 had been published



as Tentative Nomenclature Appendices 14-18 to the *Information Bulletin* (February 1972). A factual report on the status of the Faraday Constant as an analytical standard from Commission V.5 was in the final stages of approval by the Division. Two reports from Commission V.2 and one from Commission V.6 had just been circulated to the Division Committee for comment.

#### *Ad hoc Committees*

(i) *Nomenclature of Separation Processes*. The final report of the Chairman and his recommendation that the Committee should be dissolved was accepted. The Secretary was asked to convey the thanks of the Division Committee to the Members for their work.

(ii) *Key-coding of Abstracts*. Prof. HUME had reported that, owing to extraordinary other commitments with Commission work, he had been unable to make any progress to date.

(iii) *Compendium of Analytical Nomenclature*. Prof. FREISER reported that he had had little response on proposals he had made. The Secretary was asked to pursue the matter if no action was evident in a short time.

(iv) *Information Storage and Retrieval*. Prof. TANAKA reported that work was proceeding in Japan and that he hoped to produce a report in time for the Conference in 1973.

*Programmes of Commissions*. The lists of Commission projects were considered and discussed. It was noted that several Commissions were involved with nomenclature and trace analysis projects. The Secretary said that all nomenclature reports were checked by Commission V.3 to ensure that existing IUPAC recommended nomenclature was observed.

The President gave his opinion that, provided the Commission Chairmen observed the liaison promised at the Washington Conference, there should be no duplication of work in the Division.

*Coordination of Work*. The paper prepared by the Secretary which emphasized the conflict of opinions on the role of trace analysis (and purity) projects in the Division was discussed at length. The President confirmed the decision reached at the Washington Conference that there was no need to form a special coordinating committee at this time; a meeting of Commission Chairmen at an IUPAC Conference and subsequent liaison between them should serve to ensure coordination of activities.

*Proposed new Commission Members*. The appointment of Prof. V. VUKANOVIC (Yugoslavia) and Mr. R. JENKINS (USA) as Associate Members of Commission V.4 was approved.

### **Collaboration with Applied Chemistry Division**

Dr. W. W. MEINKE, Secretary of the Applied Chemistry Division, was present during discussion of this item. The President confirmed that he was most anxious that there should be cooperation between the Analytical Chemistry and Applied Chemistry Divisions. It was agreed that, for the time being, contact between the two Divisions should be through the respective Division Secretaries.

### **XXVII IUPAC Conference (1973)**

It was agreed that the Conference timetables had shown a continual improvement in recent years although time was still short. The Secretary reported that the meeting of Secretaries before the Commission meetings had been

extremely useful to him and, he understood, to the Commission Secretaries who attended. This preliminary meeting should, if possible, become a regular feature of Conferences. It was largely concerned with administrative matters, not policy.

In order that the Division programme could be given the detailed attention that it deserved more time was required after the Commission meetings, particularly as it was hoped to hold a meeting of Commission Chairmen (see above) in order to achieve coordination between Commission projects.

It was agreed, therefore, that the Secretary should request time at the 1973 Conference for the preliminary Secretaries' meeting before the Commission meetings started and for a meeting of Commission Chairmen between the end of the Commission meetings and the final Division Committee meeting.

### **Liaison with Association of Official Analytical Chemists**

Liaison between IUPAC and AOAC was agreed in principle although detailed comment was not possible because the full programme of AOAC was not known.

R. W. FENNELL

## **COMMISSION ON ANALYTICAL RADIOCHEMISTRY AND NUCLEAR MATERIALS**

**Kyoto, 4 and 6 April 1972**

*Present:* Dr. M. B. A. CRESPI (Chairman), Prof. R. E. WAINERDI (Secretary), Dr. F. GIRARDI, Prof. N. SAITO, Dr. J. C. WHITE (Titular Members); Dr. D. COMAR, Dr. W. W. MEINKE, Prof. J. MINCZEWSKI (Associate Members).

1. It was mentioned that there was a need for formal approbation or approval by every Member of documents prepared by the Commission:

(i) It was agreed that reports would be identified by the author with the indicator 'Prepared for publication by . . .'

(ii) It was also agreed that attempts would be made to buy reprints of the Commission's reports. Ten copies should be sent to each Member and an additional large number should be retained at the IUPAC Secretariat for distribution to interested scientists.

2. It was suggested that a special envelope should be printed for use in mailing out such publications plus a card saying 'With the compliments of the Chairman and the Members of Commission on . . .' The names of the Members and their countries should be listed.

3. Dr. CRESPI mentioned that he was planning to discuss the history of the Commission and its role and scope at an Open Meeting (see 19) and asked for comments. His proposal was accepted.

4. It was suggested that a project be established to serve as a clearinghouse on conferences and to provide and exchange scheduling information regarding meetings of interest to workers in radioanalytical chemistry and nuclear materials. It was decided that information on meetings now planned should be collected and disseminated to those interested in such material to the extent possible. Dr. WHITE would assemble basic data for forwarding to the Secretary.

5. Dr. GIRARDI suggested an expansion in National Representatives to include the countries who were members of IUPAC and working in radio-analytical chemistry. His proposal was accepted.
6. The discussion on roles of service of the Commission within the IUPAC ideals was the principal aim of the various public meetings being held during 1972 in Kyoto, Ljubljana, and Saclay.
7. The latest version reflecting the considerations in Washington (1971) was reported from Prof. KOSTA on *High Energy Photon Activation*. The Secretary would send the paper to all Members for their final consideration and unless suggestions were received within six weeks, it would be considered approved.
8. The next topic discussed was *Light Element Analysis*. A brief draft was distributed by Dr. CRESPI. It was considered and certain modifications were suggested by Dr. CRESPI. Progress was being made on this project. The proposed audience for this paper was reviewed and an appropriate format was designed. Any further comments for improvements were requested by Dr. CRESPI within two weeks.
9. A draft outline by Prof. SAITO on *Separation Techniques* had been prepared. All Members having comments regarding this outline were asked to send them to Prof. SAITO within two weeks.
10. Dr. WHITE reported on his task regarding *Uranium Oxides and Graphite*. He suggested a change in the task title and subject to *The Analytical Chemistry Necessary for the Production of Nuclear Materials*. A new outline would be forthcoming for the consideration of the Commission as a formal new task. In principle, this new direction was accepted and the new outline would be circulated by Dr. WHITE within five weeks.
11. Dr. GIRARDI's draft on *Fissile and Fertile Elements Analysis* was discussed. Fissile materials management and safeguard applications and interest areas were mentioned. Scheme No. 1 was preferred by a majority of the Commission. At Saclay, Dr. GIRARDI would present a document outlining nuclear methods for these analyses for the consideration of the Commission at that time.
12. Dr. SMALES' letter and Dr. HISLOP's preliminary outline on *Lead* were discussed. Since it had not been received by all Members, it would be discussed further in Saclay. The Commission thanked Drs. SMALES and HISLOP and asked that comments and suggestions for improvement be sent to them in keeping with Dr. SMALES' request.
13. Some comments on Part I of Dr. COOK's *Glossary* were received and would be given to him in Ljubljana for consideration. Some comments on Part II were received from Prof. MINCZEWSKI and were being forwarded to Dr. COOK.
14. Dr. COOK's *Review of Reviews* project was discussed and suggestions for other titles were invited. They should be sent to Dr. COOK within four weeks.
15. The Commission asked for the establishment of certain standby projects where there was constant need for surveillance of the topics.
16. The task of regarding the development of additional conventions similar to the Texas Convention for 14-MeV Neutrons was discussed by Prof. WAINERDI. A draft updating the Texas Convention would be distributed in Saclay and Conventions regarding other sources were placed under standby considerations.
17. The OECD Characterization Exchange request anticipated at Washington was discussed by Dr. MEINKE who recommended that this topic be taken off the list of possible Commission tasks since such formal requests from OECD had not materialized. This was approved.



18. An announcement would be prepared and sent to the IUPAC Secretariat for inclusion in an issue of the *Bulletin*, recommending the following as reference materials: dried orchard leaves and glass doped with 61 elements at various levels with particular reference to their suitability levels for analysis by nuclear methods. The Commission stated its continuing interest in the enhanced availability of reference materials suitable for trace analysis and encouraged their production.

19. An Open Meeting of the Commission was held in connection with the IPCR Symposium on Radiochemical Aspects of Trace Analysis. Members present were: COMAR, CRESPI, GIRARDI, MEINKE, SAITO, WAINERDI, WHITE.

Dr. CRESPI started the meeting with a series of remarks outlining the history of IUPAC, of the Commission, and related topics.

As noted above, the full cooperation of all attendees was invited by Chairman CRESPI. An important suggestion from the floor was that special attention should be paid to the problems associated with the teaching of radiochemistry. The meeting adjourned and the ICPR was then held.

20. The Open Meeting was reviewed and several suggestions were made for employing this technique at Ljubljana and Saclay in addition to personal actions on the parts of Commission Members in 'telling our message'.

21. Dr. GIRARDI would investigate information for a folder about the Commission and Dr. CRESPI would request formal approval and financing for an information folder from IUPAC. Dr. CRESPI would contact the Secretary of the Analytical Chemistry Division regarding this project.

22. The question of the addition of more National Representatives was discussed. In general, the role of the National Representative was to provide a link between the Commission and the interested people in his country. A provisional list of the countries of interest was drawn up: Australia, Brazil, Canada, Germany, Israel, Netherlands, Spain, Sweden, USSR.

23. A letter and attachment from Dr. M. PAUL, Secretary of the US National Academy of Sciences, were circulated. Comments from Commission Members were requested to be sent to Dr. CRESPI within four weeks for forwarding and consolidating a reply to Dr. PAUL from the Commission.

24. It was suggested that Dr. T. A. RAFTER be asked to enquire of the participants at the 1972 New Zealand International Radiocarbon Dating Conference as to their interest in the Commission's activities.

25. Dr. CRESPI announced the resignation of Dr. MEINKE from Membership of the Commission. The Chairman would contact all Commission Members regarding a replacement.

26. The Secretary of the Commission travelled to Bled (Yugoslavia) and, acting on behalf of the Chairman, called together four Members (COOK, HOSTE, KOSTA, WAINERDI) of the Commission attending the IAEA Symposium on The Use of Nuclear Automation in the Life Sciences, for a meeting on 13 April:

(i) Prof. J. HOSTE mentioned that a new report on 14-MeV Nuclear Activation Analysis would shortly be published by Eurisotope Bureaus and that copies would be sent to all Members.

(ii) Prof. WAINERDI chaired an Open Meeting of the Commission at the end of a session of the IAEA Symposium in Bled through the courtesy of the Conference organizers. His remarks were similar to those of Dr. CRESPI in Kyoto. Very good response was obtained from the participants at the IAEA meeting, who showed considerable interest in the work of the Commission.

R. E. WAINERDI

## STUDY ON PURIFICATION OF CHEMICALS FOR TRACE ANALYSIS\*

Industry supplies analytical reagents of various grades of purity and also, to an increasing extent, high purity reagents for trace analysis.

Because of the great importance of trace analysis an investigation was made into the extent to which reagents used in trace analysis are purified in laboratories. The study took the form of an inquiry in which a questionnaire was sent to some 240 laboratories in all parts of the world. Since it was virtually impossible to contact every one of the laboratories active in the field of trace analysis, the inquiry was from the start limited to a representative cross-section of scientists. The result may therefore be said to show a picture approaching the overall situation.

Tables 1-3 summarize the main results of the investigation. Table 1 gives the number of questionnaires sent out and answered, as well as the quota of laboratories conducting trace analysis and the extent to which reagents are purified in these laboratories. According to the total average of Europe and Rest of world given in the bottom line of Table 1, 58% of the laboratories doing trace analysis purify the reagents used. Some 42% of the laboratories do not purify the reagents, because they either conduct trace analyses without any reagents by means of physical methods (10%) or else employ high purity reagents which are commercially available (32%).

Table 2 shows that apart from water, hydrochloric acid, nitric acid, and ammonia are purified most frequently. In order to be better able to assess the data listed in Tables 1 and 2, the question to be considered next was whether the reagents purified in the laboratories were also available on the market in the required degree of purity.

With regard to the reagents hydrochloric acid, nitric acid, and ammonia, therefore, the degree of purity which was required or obtained by purification, as specified in the questionnaire, was compared with that of the high purity reagents available, for example, from E. Merck AG (Germany). The average figures from Europe and Rest of world given in Table 3 show that in 70% of all cases, hydrochloric acid and nitric acid and, in 60% of all cases, also ammonia are available on the market in the required degree of purity. For that reason the purification of the reagents by the scientists themselves does not appear to be as important today as it was several years ago. Evidently, there are two reasons which are primarily responsible for the individual purification of reagents, in spite of their commercial availability:

1. there is no industry or supplying firm for high purity reagents at hand,
2. too high costs of high purity reagents for those laboratories that are adequately equipped and staffed but suffer from lack of financial resources.

If these aspects are left out of consideration, there remains the necessity of purifying the principal reagents in about 30% of all cases. In general, purification appears to be limited to special reagents and special cases.

It is concluded that, at present, industry supplies a number of the principal reagents in high enough purity, which are adequate for the majority of trace analyses. Only in special cases is the purification of reagents necessary.

O. G. KOCH\*

\*Commission on Microchemical Techniques and Trace Analysis of Analytical Chemistry Division

Table 1—Frequency of purification of reagents in laboratories performing trace analysis

Continent	Country	Number of questionnaires		From questionnaires returned		From laboratories with trace analysis	
		Distributed	Returned	Laboratories with trace analysis		Purification of reagents	
				Yes	No	Yes	No
Europe	Austria	8	5	5	—	2	3
	Belgium	1	1	1	—	1	—
	Czechoslovakia	5	4	3	1	2	1
	England	5	3	3	—	1	2
	France	18	9	9	—	4	5
	Germany	66	44	32	12	17	15
	Hungary	1	—	—	—	—	—
	Netherlands	4	3	1*	2	1	—
	Norway	2	1	—	1	—	—
	Poland	3	3	2	1	2	—
	Sweden	1	—	—	—	—	—
	Switzerland	7	4	1	3	1	—
	USSR	20	3	3	—	3	—
	Yugoslavia	1	—	—	—	—	—
Total		142	80	60	20	34	26
Percentage						57	43
Rest of world	Australia	3	3	3	—	2	1
	Canada	1	1	1	—	1	—
	Israel	1	1	1	—	—	1
	Japan	17	12	12	—	11	1
	USA	73	60	35	25	17	18
Total		95	77	52	25	31	21
Percentage						60	40
Europe + Rest of world	Total	237	157	112	45	65	47
	Percentage					58	42

\* microanalysis



Table 2—Frequency of purification of reagents in laboratories performing trace analysis

Continent	Country	Reagents	H <sub>2</sub> O	HCl	HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	HClO <sub>4</sub>	HF	HI	HBr	NH <sub>3</sub>	CH <sub>3</sub> COOH	Various
Europe	Austria	2			1						1	1	1
	Belgium	1											
	Czechoslovakia	2		1		1					1		2
	England	1		1	1						1	1	1
	France	4		1	1	1					1	1	
	Germany	13		5	4	3	2	2			5		6
	Netherlands	1											
	Poland	2		2	1	1	1	1	1	1	2		1
	Switzerland	1									1		1
	USSR	3		2	2		1	1		2	2	1	1
	Total	30		12	10	6	4	4	1	3	14	4	13
	Percentage*	34		14	11	7	4.5	4.5	1	3	16	5	
Rest of world	Australia	2		1	1								
	Canada	1									1		1
	Japan	7		8	6	4	2	2	1	2	6	1	7
	USA	10		6	5			1	1		7	3	12
Europe + Rest of world	Total	20		15	12	4	2	3	2	2	14	4	20
	Percentage*	25		19	15	5	3	4	3	3	18	5	
Europe + Rest of world	Total	50		27	22	10	6	7	3	5	28	8	33
	Percentage*	30		16	13	6	4	4	2	3	17	5	

\* without 'various reagents'

Table 3—Reagents available from E. Merck AG (Germany) in required degree of purity and/or reached through purification by laboratories performing trace analysis

Continent	Reagents available from E. Merck AG (Germany)					
	HCl		HNO <sub>3</sub>		NH <sub>3</sub>	
	Yes	No	Yes	No	Yes	No
Europe	10 83	2 17	7 70	3 30	9 64	5 36
Rest of world	7 58	5 42	4 67	2 33	6 55	5 45
Europe + Rest of world	17 71	7 29	11 69	5 31	15 60	10 40

# IUPAC PUBLICATIONS

## 1971

A compilation of IUPAC Publications covering the period 1966–1970 was published in *Information Bulletin* No. 41 (November 1971). The present listing attempts to cover everything issued during 1971.

*The IUPAC Secretariat would be pleased to receive notification of any omissions from this listing, especially of translations completed or in process of being prepared of IUPAC nomenclature recommendations.*

### Pure and Applied Chemistry\*

- Vol. 25, No. 1: Plenary Lectures from VIIth International Symposium on Chemistry of Natural Products, Riga (USSR), June 1970
- Vol. 25, No. 2: Plenary Lectures from Symposium on Non-aqueous Electrochemistry, Paris (France), July 1970  
Commission on Electroanalytical Chemistry: Purification of Dimethylsulphoxide for Electrochemical Experimentation
- Vol. 25, No. 3: Plenary Lectures from International Conference on Conformational Analysis, Brussels (Belgium), September 1969
- Vol. 25, No. 4: Plenary Lectures from IIIrd Analytical Chemistry Conference, Budapest (Hungary), August 1970
- Vol. 26, No. 1: Plenary Lectures from VIth International Symposium on Microtechniques, Graz (Austria), September 1970  
Section on Food: Survey of Analytical Methods available for Estimation of Some Food Additives in Food
- Vol. 26, No. 2: Main Lectures from VIIth Microsymposium on Macromolecules, Prague (Czechoslovakia), September 1970  
Commission on Radioanalytical Chemistry and Nuclear Materials: Radioactive Tracers in Inorganic Chemicals Analysis (A Guide)
- Vol. 26, Nos. 3-4: Main and Survey Lectures from International Symposium on Macromolecules, Leiden (Netherlands), August-September 1970
- Vol. 27, Nos. 1-2: Plenary Lectures from XIIIth International Conference on Coordination Chemistry, Cracow-Zakopane (Poland), September 1970  
Commission on Electroanalytical Chemistry: Pyridine—Purification and Tests for Purity; Propylene Carbonate—Purification and Tests for Purity; *N*-Methylacetamide—Purification and Tests for Purity  
Commission on Radioanalytical Chemistry and Nuclear Materials: Preparation of Reference Samples for Uranium in Low Grade Ores
- Vol. 27, No. 3: Plenary Lectures from IInd International Symposium on Organic Solid-state Chemistry, Rehovot (Israel), September 1970
- Vol. 27, No. 4: Main Lectures from Vth International Symposium on Carbohydrate Chemistry, Paris (France), August 1970  
Specially Invited Lectures from Symposium on Cycloaddition Reactions, Munich (Germany), September 1970
- Vol. 28, No. 1: Commission on Nomenclature of Inorganic Chemistry: Nomenclature of Inorganic Chemistry, Second Edition—Definitive Rules 1970

\*Official journal of IUPAC and supplements to it are available from Butterworth & Co. (Publishers) Ltd., 88 Kingsway, London WC2B 6AB, UK.

Much of the important material which appears in the journal is published shortly afterwards in book form.



Vol. 28, Nos. 2-3: Specially Invited Lectures from International Symposium on the Chemistry of Nonbenzenoid Aromatic Compounds, Sendai (Japan), August 1970

Vol. 28, No. 4: Specially Invited Lectures from Symposium on Antibiotics, Ste. Marguerite, Quebec (Canada), March 1971

### Information Bulletin\*

No. 39, February 1971

[Commission on Electrochemistry: Electrochemical Kinetics—Guidelines for Design of Mechanistically significant Experimentation]

No. 40, June 1971

No. 41, November 1971

[Section on Medicinal Chemistry: Bad Patent Practices]

#### *Appendices on Tentative Nomenclature, Symbols, Units, and Standards*

†No. 9, February 1971: Abbreviations and Symbols for Nucleic Acids, Polynucleotides, and Their Constituents (IUPAC-IUB Commission on Biochemical Nomenclature)

†No. 10, February 1971: Abbreviations and Symbols for Description of Conformation of Polypeptide Chains (IUPAC-IUB Commission on Biochemical Nomenclature)

†No. 11, February 1971: Recommendations for Presentation of Raman Spectra for Cataloging and Documentation in Permanent Data Collections (Commission on Molecular Structure and Spectroscopy)

†No. 12, February 1971: List of Abbreviations for Synthetic Polymers and Polymer Materials (Commission on Macromolecular Nomenclature)

†No. 13, February 1971: Basic Definitions of Terms Relating to Polymers (Commission on Macromolecular Nomenclature)

#### *Technical Reports Appendices*

No. 1, June 1971: Collaborative Study of a Method for Determination of Concentration and Purity of Aflatoxin Standards and Use of the Method for Measuring Stability of the Standards (Commission on Trace Substances of Section on Food)

No. 2, June 1971: Minimum Specifications for Seven Extraction Solvents used in Food Processing (Commission on Food Additives and Contaminants of Section on Food)

No. 3, June 1971: World Wide Survey of Fermentation Industries, 1967 (Section on Fermentation Industries)

### Miscellaneous

‡Nomenclature of Organic Chemistry: Sections A, B (Third Edition) and Section C (Second Edition)

‡Characterization of Chemical Purity: Organic Compounds

‡Selected Constants: Oxidation-Reduction Potentials of Inorganic Substances in Aqueous Solution

\*Available from IUPAC Secretariat.

†Now out of print.

‡Supplement to *Pure and Applied Chemistry*.

\*XXIIIrd International Congress of Pure and Applied Chemistry, Boston, Massachusetts (USA), July 1971: Selected Lectures from the Various Symposia:-

Vol. 1—Applications of Quantum Mechanics to Organic Chemistry  
Intramolecular Rearrangements, Valence Isomerization, and Cycloaddition  
Photochemistry

Vol. 2—General Methods of Synthesis  
New Natural Product Syntheses  
Small Rings

Vol. 3—Medicinal Chemistry  
Insect Chemistry

Vol. 4—Short-lived Intermediates  
Free Radicals and Homolytic Mechanisms  
Ion Pair Processes

Vol. 5—Biosynthesis  
Mechanism of Enzyme Action

Vol. 6—Organo-transition Metal Chemistry  
Homogeneous Catalysis

Vol. 7—Spectroscopy in Structure Determination  
Advances in Conformational Analysis  
Synthesis and Conformation of Biopolymers

Vol. 8—Macromolecular Symposia

Základní Stereochemická Nomenklatura [*Chem. listy* 65, 823 (1971)]—  
Czechoslovak version of Nomenclature of Organic Chemistry. Section E—  
Fundamental Stereochemistry (tentative: *Information Bulletin* No. 35, June  
1969)

†Bulletin of Thermodynamics and Thermochemistry—No. 14, May 1971

‡Bibliography on High Temperature Chemistry and Physics of Materials:-

Vol. 15, No. 1: January-March 1971

Vol. 15, No. 2: April-June 1971

Vol. 15, No. 3: July-September 1971

Vol. 15, No. 4: October-December 1971

\*\*Stability Constants of Metal-ion Complexes: Supplement No. 1

††Kinetics and Mechanism of Polyreactions, Plenary and Main Lectures from  
IUPAC International Symposium on Macromolecular Chemistry, Buda-  
pest (Hungary), August 1969

\*Supplement to *Pure and Applied Chemistry*.

†Available from Publications Distribution Service, University of Michigan, 615 East  
University Avenue, Ann Arbor, Michigan 48106, USA.

‡Available from Dr. M. G. Hocking, Imperial College of Science and Technology,  
London SW7, UK.

\*\*Special Publication No. 25, Chemical Society, Burlington House, Piccadilly, London  
W1V 0BN, UK.

††Available from Akadémiai Kiadó, Budapest, Hungary.

## REPORTS OF IUPAC-SPONSORED SYMPOSIA

### II INTERNATIONAL CONGRESS OF PESTICIDE CHEMISTRY

Tel-Aviv, 22-26 February 1971

The Congress was sponsored by IUPAC and the Israel National Council for Research and Development. Over 700 scientists representing 35 countries participated. Some 18 Symposia and 14 Workshop-Sessions were held. The Congress dealt with the relation of chemical structure to biological activity; mode of action of insecticides, including plant systemics and those of plant origin, fungicides and herbicides; various aspects of residue analysis and tolerances; biochemistry of pesticides and chemical releasers in insects such as hormones, pheromones, and defense secretions. Special Sessions were devoted to biochemistry of resistance, enzyme induction phenomena, synergists, chemosterilants and formulation chemistry. Problems of terminal residues of pesticides, to which a special three-day IUPAC symposium preceding the Congress was devoted (see *Information Bulletin* No. 40, June 1971, p. 77), were also discussed at Workshop-Sessions with large audience participation.

The Proceedings are being published by Gordon & Breach, New York, in six volumes:

Vol. I: Insecticides

Vol. II: Resistance, Synergism and Enzyme Induction Phenomena

Vol. III: Chemical Releasers in Insects

Vol. IV: Methods in Residue Analysis

Vol. V: Fungicides and Herbicides and Formulation Chemistry

Vol. VI: Fate of Pesticides in Mammals, Soil, and Environment

A. S. TAHORI

### III INTERNATIONAL CONGRESS ON CRYSTAL GROWTH

Marseilles, 5-9 July 1971

The Congress was held on the campus of the University of Marseilles-Luminy under the sponsorship of the International Committee on Crystal Growth, IUPAC, IUPAP, and IUCr. The proceedings are being published under the title *Crystal Growth 1971* by North-Holland early in 1972.

About 650 participants (420 from abroad) were attracted to the meeting, thanks to the generous support which was received from many public and private organizations, both French and foreign, as well as through the devotion of some 100 organizers in the University of Marseilles.

From the Congress one remembers particularly the opening ceremony in the Grand Amphitheatre de l'École des Beaux Arts, at which Prof. B. MUTAFTSCHIEV welcomed the participants and explained the historical reasons for holding the meeting at Marseilles. Prof. H. CURIEN, Director General of Centre National de la Recherche Scientifique (CNRS), opened the Congress and recalled the memory of Sir LAWRENCE BRAGG who died



on 3 July 1971, and whose work in the field of crystallography had permitted interdisciplinary meetings such as ICCG to be held today. He added that ICCG had everything to remind the organizers of science of the fact that all disciplines interact and that fundamental and applied research were mutually stimulating.

I. N. STRANSKI (Berlin) underlined various historical points which had led during the last 30 years to atomistic conceptions of crystal nucleation. F. C. FRANK (Bristol) indicated his feelings on the growth of this science but declined to become involved in philosophical considerations. L. NEEL (Grenoble) recalled that what was known about magnetic domains came from the complex phenomena usually observed in thin films and he emphasized the need to study the certainly simpler bulk phenomena. K. NASSAU (Bell Telephone Laboratories) enthusiastically presented a biography of A. V. L. VERNEUIL, and placed the man and his method in the context of French chemistry of the period and the beginnings of single crystal work in Paris and USA. The presence of VERNEUIL's nephew and his family gave a personal flavour to this occasion.

The Congress exhibition, in the entrance hall of the University, attracted 30 firms from Europe and overseas. The exhibits and collections of single crystals formed a picturesque scene and could be admired by the participants from the balcony of the refreshment room overlooking the hall. The participants passed many hours of relaxation and discussion there.

The session of 10 original scientific films was another important aspect of the Congress. The audience was literally fascinated by some of them, notably the almost alimetary production of trichites of silver by electrolysis from a crystal of silver sulphide; their simple disappearance was as astonishing as their appearance (T. OHACHI). Experiments on the stability of floating zones (J. CARRUTHERS) deserved to be filmed in view of the difficulties involved in their realization. There was admiration for the high degree of technical skill shown by H. E. LA BELLE, JR., in the rapid formation of sapphire crystals in various well-defined forms, directly usable by industry. All the films presented were of a high educational standard: the pure scientist could find in them a germ to stimulate his imagination while the applied scientist could draw from them the energy to excel himself.

The scientific organization of the Congress was by the 23 members of the Programme Committee which aimed to continue the ideals of ICCG I and II. Moreover, a more important place (about 30%) had to be given to fundamental aspects of crystal growth. This was necessary because authors had responded by sending papers on this subject. These meetings were amongst the best attended, not only by the specialists but also by the experimentalists. An attempt was made to introduce new headings such as electrocrystallization, bulk industrial crystallization, characteristics of crystal perfection and high polymers. Except for the latter, which ended in a single session, they were a success, particularly that on crystal perfection which extended over three sessions. The Programme Committee took into account the wishes of participants in ICCG II to increase the number of invited lectures. Of 23 invited, 21 actually took place.

The adverse side of the picture was that it was necessary to organize five parallel sessions for the 300 contributed papers. However, the arrangement of rooms and illuminated charts showing the exact position of each room, minimized the usual inconvenience of such parallel sessions.

The choice of invited lecturers was made by vote in the Programme Committee, based on ideas from 50 people completely outside the Congress

organization. The approach proved interesting and effective in that much original and important work was presented.

The Congresses at Boston (ICCG I) and Birmingham (ICCG II) revealed the importance of fundamental research on morphological stability. Advanced techniques in mathematical physics had allowed the formulation of phenomena previously not understood (e.g., dendrites, eutectics).

At ICCG III this work had shrunk. However, two new opposing tendencies had appeared. R. F. SEKERKE thought that macroscopic considerations could be developed to advantage in order to resolve the final difficulty, while W. A. TILLER was trying to resolve the problem in the form of elementary mechanisms of layer growth. At the moment the field was quiet but a resurgence of interest could be expected.

There was also much other very interesting work going on considering crystal growth as an atomistic phenomena. At the Boston Congress, N. CABRERA drew attention to this field which was then being neglected by certain schools. A particularly attractive exercise consisted of stimulating by computer the critical movement of atoms at the point of growth. A. A. CHERNOV initiated this new approach in 1965 by the study of mixed crystals of AB composition. His work was still relevant because he had complemented his experimental work by an exact simulation analysis in terms of probabilities. Thus, he was able to make a continuous comparison with the computer. One Congress participant remarked that computers could multiply errors if care was not taken. This provoked discussion between Dutch and American research workers. F. L. BINSBERGER had voluntarily and correctly confined himself to a simulation study on the Kossel crystal, similar to that studied by BECKER and DÖRING, fixing the parameters so that they represented igneous growth. The simulation represented the actual mechanism of growth with the supersaturation as was predicted by the full theory (two and three-dimensional nucleation). It did not, however, give the magnitude of the energy predicted by the equations. This disagreement between theory and 'experiment' suggested a further examination of the basis of the theory in which only unexcited configurations were taken into account. The work of P. BENNEMA, G. H. GILMER and the school of K. A. JACKSON included models which were already more complex and certain anomalies encountered could have been due to systematic experimental errors. This field would probably develop greatly in the coming years.

Significant progress had been made in treatments of the statistical mechanism which was involved in crystalline evaporation (T. SUREK) or homogeneous nucleation (K. NISHIOKA). The structure of stable nuclei of very small dimensions (B. MUTAFTSHIEV) seemed to have no crystal symmetry; their growth into crystals posed a problem (H. S. PEISER) unless they twined into complex structures, which had actually been observed (S. OGAWA) and whose mechanism of formation could be qualitatively understood (M. GILLET). Two model studies on electrocrystallization were reported (E. BUDEVSKI and J. CORISH). The first author, working on quality-controlled crystals, reviewed all the important properties which could be varied to verify the different modes of crystal growth. In the second study, on complex silver trichites produced by controlled electrolytes in the solid state after mechanical initiation or a localized deposition of silver, the overpressures necessary to growth or dissolution were such that the transfer of silver atoms from one phase to the other controlled the kinetics.

Hydrodynamic phenomena also appeared to have been the subject of interest from the theorists and the relation to temperature and compositional



variations led to immediate practical considerations (HURLE, COLE, and SCHULZ-DUBOIS).

The investigation of crystal perfection, particularly using Lang's method, had become common place and made possible, with other observations such as growth and corrosion figures, a reconstruction of the history of a crystal (A. AUTHIER, F. C. FRANK). The study of a type of crystal such as  $\text{CaF}_2$  produced by different methods of growth, furnished much information, particularly if different kinds of defect were considered (K. RECKER).

At this point one had already reached the domain of materials. It was pleasant to say that there also one found a desire to examine the problems thoroughly. One example was the study of growth by gas phase transport carried out either on silicon (J. NISHIZAWA) or GaAs (L. HOLLAN) in the shape of a hemisphere. The lateral and normal growth could be measured, particularly when colour marking was carried out by instantaneous injection of a dye into the system.

Magnetic garnets were materials which received particular attention (10 communications). Their drawing by the Czochralski method seemed to be advantageous (J. MARESCHAL); their interest in terms of crystallochemical requirements were emphasized by R. A. LAUDISE. Few new materials were presented, except for ferroelectric  $\text{Sr}_2\text{Nb}_2\text{O}_7$  (M. TAKAHASHI) and semi-conducting nitrides with a broad forbidden band (M. ILEGEMS, J. P. DISMUKES, D. K. WICHENDEN). In contrast, new applications for certain materials had been developed, e.g., large single mixed crystals, with a lattice parameter gradient, such that the Cu-Ge acted as a new type of monochromator for neutron diffraction with high transmission (F. FORRAT).

In association with this technology, intense activity was being generated. In industrial practice, crystal drawing by the Czochralski method of great lengths at constant diameter with automation by infrared detection coupled to a computer (D. F. O'KANE) was proving its importance. The cold-crucible method had been considerably improved, thanks to the conception of very symmetrical induction coils and gave a large output. Contamination by the crucible of materials such as Nb, La, Mo, Cu, Al, Si, and Ge was hardly detectable (D. A. HUKIN). Czochralski crystal drawing of III-V and II-VI compounds had been achieved under excess pressure over the volatile compound, thanks to a secondary source of this compound, pressure equilibrium being kept by the magnitude of the pressure required to transmit an inert gas outwards (J. B. MULLIN).

The technology of heat pipes, coming from the field of nuclear energy, had now been introduced into crystal growth laboratories. Their very high thermal conductivity, surpassing that of copper by several orders of magnitude, and their ability to remove heat led to unexpected applications, including the realization of regions with no thermal gradients and regions with very sharp gradients. The shapes of the heat pipes could be altered as easily as the operating temperature zone (I. T. STEININGER).

Undoubtedly the peak of *savoir faire* in crystal growth was presented by a team from Tyco Laboratories. The principle of drawing single crystals in a well-determined shape through pipes was similar to that used by glass-blowers and went back, as far as crystals were concerned, to STEPANOV (1959) and GOL'TSMAN (1962). In the technique now reported by J. E. LAPELLE, JR., the shape of the crystal was not determined by the orifice of the pipe as was the case previously. Here the orifice was used solely to bring, by capillary flow, the liquid bath to the top surface of the pipe in which it ran. A seed placed in contact with the liquid layer was able to draw a single crystal



whose section was defined by the cross-section of the pipe. These authors had, therefore, played in a clever way with capillary forces. Some hundreds of metres of refractory crystals, perfect and often complicated in shape, could be drawn at speeds of several centimetres per second. The audience was completely overwhelmed by this apparently simple technique. There was no doubt that such a performance would have considerable repercussions in industry and certainly lead to further development in crystal growth laboratories.

In this field, many advances were taking place and efforts being made to develop new techniques. Thus, for the two weeks preceding ICCG III, P. HARTMAN of Leiden organized a summer school on crystal growth. IUCr and ICCG III supported this enterprise which brought together 120 participants around a nucleus of young professors. Finally, it could be said that even though ICCG III did not bring to light any great discovery, it showed that the field of crystal growth was more active than ever.

R. KERN

## V INTERNATIONAL CONFERENCE ON ORGANOMETALLIC CHEMISTRY

Moscow, 16-21 August 1971

The Conference was sponsored by the Academy of Sciences of USSR and IUPAC. There were 885 active participants representing 25 countries. Abstracts of 469 reports were issued: 7 plenary lectures, 11 section lectures, and 188 short reports were presented orally at the actual sessions. Lectures and reports came from the following countries: 44—USSR; 28—USA; 20—GFR; 18—UK; 15—Japan; 14—France; 10—Italy; 5—Canada and GDR each; 4—Belgium, Czechoslovakia, and Netherlands each; 1-3—Bulgaria, Denmark, Hungary, Israel, Lebanon, Poland, Romania, Sweden, Switzerland.

Opening the Conference the Chairman of the Organizing Committee, Prof. A. N. NESMEYANOV, pointed out that 1971 was an anniversary year for chemistry as a whole and for organometallic chemistry in particular, since it was the 100th anniversary of VICTOR GRIGNARD's birthday. The use of organomagnesium synthesis played an invaluable role in the development of organic and organometallic chemistry. Organometallic chemistry of transition metals was also fed at its inception by the Grignard reaction—the synthesis of Group VI metal carbonyls, organochromium compounds, *etc.*

At present organometallic chemistry, which had developed into organo-element chemistry, constituted a wide bridge between organic and inorganic chemistry.

Research in the field of organomagnesium compounds was dealt with in Prof. H. NORMANT's plenary lecture as well as in a number of reports. Prof. NORMANT spoke about *The Chemistry of Organomagnesium Compounds in France after Grignard*. A new step in the development of this field was the use of basic solvents, *viz.* tetrahydrofuran (1954) and hexametapole (1964). Reactions in these solvents and also the use of low temperatures made it possible to synthesize new organomagnesium compounds that could not previously be obtained. As a result of research carried out by French chemists vinyl and allene organomagnesium compounds were prepared; it became possible to obtain different organomagnesium compounds with functional groups, and in many cases a considerable increase in yields and selectivity of reactions was achieved. In addition, it was shown that the use of systems  $R_3SiCl + R'MgBr$  in HMPT led to formation of the C-Si bond.

Great attention at the Conference was devoted to research in organic

derivatives of transition metals, particularly to the studies of transition metal  $\pi$ -complexes. These studies were dealt with in 3 plenary lectures and 5 section lectures; also, a lot of short reports were devoted to this subject. In a number of reports studies of metallocenes, metal carbonyls, and synthesis of multi-nuclear metal carbonyls with metal-metal bonds were discussed.

Prof. G. T. SEABORG in his lecture *Recent Advances in the Chemistry of Organometallic Compounds of the Actinide Elements* described intricate experiments with the use of micro techniques to produce and study the structure of  $\text{CfCp}_3$ ,  $\text{CmCp}_3$ ,  $\text{AmCp}_3$ . At present a compound  $\text{U}(\text{COT})_2$  had been obtained and its sandwich-like structure shown by X-ray diffraction study; it constituted the first example of a sandwich  $\pi$ -complex with  $f$ -electrons involved in the bonding. Furthermore,  $\text{Np}(\text{COT})_2$ ,  $\text{Pu}(\text{COT})_2$ , and also  $\text{M}(\text{COT})_2$  had been obtained where  $\text{M}=\text{Ce}$ ,  $\text{Pr}$ ,  $\text{Nd}$ ,  $\text{Tb}$ ,  $\text{Sm}$ . Compounds of the last type had been shown to have ionic structure.

Carbene complexes were widely represented at the Conference, in particular in Prof. E. O. FISCHER's lecture *Recent Aspects of Transition Metal Carbonyl Carbene Complexes*. Prof. FISCHER spoke about the synthesis of transition metal complexes where carbene was attached to sulphur, selenium, or phosphorus and also to two heteroatoms, oxygen and nitrogen. In the author's laboratory the structure and physicochemical properties of this complex containing  $\text{Cr}$ ,  $\text{W}$ ,  $\text{Ni}$ ,  $\text{Fe}$ , and  $\text{Mo}$  had been investigated. In the study of chemical properties methoxyphenylcarbene was found to transfer from pentacarbonylmethoxyphenylchromium, -molybdenum, and -vanadium to the ethyl ester of *trans*-crotonic acid, ethyl-vinyl ester, diethyl ester of fumaramic acid with the formation of cyclopropane derivatives. It was found also that methoxyphenylcarbene was capable of insertion into the  $\text{Si-H}$  bond but incapable of insertion into the  $\text{C-H}$  bond. The author gave an interesting and versatile review of the trend to use organometallic compounds as homogeneous catalysts for di-, oligo-, and polymerization of olefins and acetylenes, isomerization, insertion of carbenes, nitrogen, carbon oxide, etc.

Prof. M. E. VOL'PIN devoted his lecture to the study of nitrogen activation and its fixation by organometallic compounds. At present it had become possible to reduce coordinated nitrogen with the formation of hydrazine or ammonia. Moreover, the process of nitrogen fixation and reduction was made catalytic. It was shown further that coordinated nitrogen was capable of insertion into a metal-carbon bond which resulted in formation of amines directly from hydrocarbons and nitrogen.

Studies of transition metal organic compounds with  $\sigma$ -bond carbon-metal were discussed at the Conference. Prof. G. WILKINSON in his lecture gave his considerations and experimental data which disproved the general conception of the  $\sigma$ -bond strength between alkyl and a transition metal being low and the presence of  $\pi$ -acid ligands such as  $\text{CO}$ ,  $\text{R}_3\text{P}$ ,  $\pi\text{-C}_5\text{H}_5$ , etc., on the metal being necessary for the existence of stable metal-carbon  $\sigma$ -bonds. The difficulties in obtaining compounds with alkyl-transition metal could not be attributed to the low bonding strength, but, evidently, might be caused by the elimination reaction of alkene or arene.

Prof. F. G. A. STONE gave convincing data concerning the role of fluorocarbons in oxidative-elimination reactions of  $d^{10}$  complexes.

In Prof. T. G. TRAYLOR's lecture the nature of carbon-metal  $\sigma$ - $\pi$ -conjugation alongside the dependence of this conjugation on electron deficiency were discussed, and a general theory for this subject was presented.

Chemistry of organometallic compounds of nontransition metals were presented at the Conference by a small number of reports. One of the most



important achievements in this field was the synthesis of optically active compounds with an asymmetric tin atom.

Chemistry of carboranes was presented in Prof. L. TODD's lecture and in some other reports.

The plenary and section lectures have been published in the official journal of IUPAC [*Pure and Applied Chemistry* 30 (3-4), (1972)] and they are also available reprinted in book form.

Z. N. PARNES

## **IV INTERNATIONAL SYMPOSIUM ON MAGNETIC RESONANCE**

**Rehovot and Jerusalem, 25-31 August 1971**

Held under the auspices of the International Society of Magnetic Resonance and sponsored by IUPAC, IUPAP, IUBS, and the Israel Academy of Sciences and Humanities, the Symposium marked the 25th anniversary of the discovery of the phenomenon of nuclear magnetic resonance. The meetings took place at the Weizmann Institute of Science in Rehovot and the Hebrew University of Jerusalem.

About 370 scientists participated from the following 28 countries—Argentina, Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, India, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Romania, Spain, South Africa, Sweden, Switzerland, Turkey, UK, USA, Venezuela, and Yugoslavia. Some 180 papers were presented: 3 were plenary, 36 invited, and 141 contributed. Most of them dealt with nuclear magnetic resonance and its applications to physics, chemistry, and biology and their interdisciplinary character. Other fields discussed were electron spin resonance, quadrupole resonance, and ferromagnetic resonance. Because of the large number of papers it was necessary to hold four parallel sessions, two were physically oriented, one chemically and one biologically. The invited lectures are being published in the IUPAC journal *Pure and Applied Chemistry* (scheduled Vol. 32, Nos. 1-3, 1972) and they will also be available in book form.

The welcoming address at the opening of the Symposium was given by the President of the Weizmann Institute of Science—Dr. A. B. SABIN. Prof. S. FUJIIWARA greeted the participants in the name of IUPAC. The opening lecture was given by Prof. F. BLOCH, Nobel Prize Laureate for discovery of the phenomenon of nuclear magnetic resonance (1946). He described the preliminary experiments which led to discovery of the phenomenon of nuclear magnetic resonance by his group and that of Prof. E. M. PURCELL. He discussed some of the important discoveries that led to the development and extensive application of nuclear magnetic resonance in physics, chemistry, and biology—among which were the discovery of chemical shift by PROCTOR, YU, and DICKINSON; the discovery of chemical shift in metals, the Knight-shift, by KNIGHT; the discovery of spin-spin splitting by GUTOWSKY and his colleagues; and the discovery of spin echoes by HAHN.

Following Dr. BLOCH's talk the International Society of Magnetic Resonance Award for distinguished service in the advancement of nuclear magnetic resonance and its applications was presented to Dr. E. HAHN of Berkeley, California, for his discovery of the spin echo phenomenon and for many other distinguished contributions.

The welcoming address of the second part of the Symposium, held in Jerusalem, was given by the President of the Hebrew University, Dr. A.



HARMANN. Following this address Dr. W. D. KNIGHT (USA) and Dr. H. S. GUTOWSKY (USA) presented plenary lectures. Dr. KNIGHT's topic was *Resonance: Nuclei and People* and Dr. GUTOWSKY's topic concerned *Spin Diffusion and Exchange in Solids*.

In the sessions devoted to discussion of novel experimental techniques in nuclear magnetic resonance, various aspects of high resolution studies of solids were discussed extensively by Dr. E. R. ANDREW (UK), Dr. J. S. WAUGH (USA), and Dr. U. HAEBERLEN (Germany). Dr. ANDREW's paper concerned the motional narrowing of NMR spectra of solids, both microscopic due to internal molecular motions and macroscopic by means of Andrew's method of magic axis rotation. Dr. WAUGH pointed out the meaning of spin echoes in the context of the thermodynamics of irreversible processes and reported a newly developed method of *magic sandwich* echoes by which the dipolar decay of the spins was restored. Dr. HAEBERLEN gave an account of the use of multiple pulse experiments in high resolution NMR in solids.

Prof. FUJIWARA (Japan) discussed the several applications to which  $^{13}\text{C}$  satellite lines in NMR spectra could serve for determination of molecular structure, abundance ratios of isotopes, and the relaxation mechanism of the spins of carbon nuclei. The possibilities opened by the Fourier transform techniques for studying  $^{13}\text{C}$  NMR at natural abundance were reviewed by Dr. E. D. BECKER (USA). Dr. W. A. ANDERSON (USA) discussed new developments in the use of Fourier transform techniques for the study of nuclear spin-lattice and spin-spin relaxation.

Dr. G. J. BÉNÉ (Switzerland) pointed out that the fundamental phenomenon which was the basis of spin echo technique was essentially nonresonant. He showed phenomenologically and illustrated by experiments that echoes could be obtained by nonresonant methods in the terrestrial magnetic field range.

Some very interesting aspects of dynamic nuclear polarization were discussed. Dr. K. H. HAUSSER (Germany) presented typical experimental results in the field of optical spin polarization in molecular crystals. He dwelt on polarization of the electron spin of optically excited triplet states and on nuclear polarization due to the interaction with polarized triplet states and triplet excitons. The phenomenon of chemically induced dynamic polarization was reviewed by Dr. H. FISCHER (Switzerland).

The principle speakers in the sessions devoted to orientational effects in NMR elaborated the various aspects of studies of these effects. Dr. S. MEIBOOM's (USA) paper concerned the simplification of complex NMR spectra of molecules in oriented nematic solvents by partial deuterium substitution. The decoupling of the deuterium by a recently developed method of double irradiation was described. The study of intramolecular motion by NMR of oriented molecules was reviewed by Dr. P. DIEHL (Switzerland). The typical problems, scope and limitation of the method, were critically examined. Dr. W. G. CLARK (USA) discussed relaxation effects in liquid crystals. Dr. C. MACLEAN (Netherlands) discussed the effects of strong external electric fields on the NMR spectra of polar and nonpolar molecules.

Solvent effects on the NMR spectra of gases and liquids were dealt with by Dr. H. J. BERNSTEIN (Canada). They were treated on the basis of a binary collision model, taking into consideration the anisotropic contributions from polar or nonpolar solvents.

Dr. R. BLINC (Yugoslavia) reviewed some recent NMR, NQR, and double resonance studies of structural phase transition (with particular emphasis on ferroelectrics and liquid crystals) and discussed the information about

the static and dynamic properties that could be gained by this technique. Dr. M. GOLDMAN (France) discussed nuclear magnetic ordering in diamagnetic solids. The low temperatures required were achieved by cooling only the nuclear spins in a two-step process which lowered their temperature below  $10^{-6}$  K. Results on perpendicular susceptibility and critical field were found to be in qualitative agreement with an extension of the Weiss field theory.

Dr. M. WEGER (Israel) reviewed various microscopic features of superconductivity and NMR experiments related to them. Dr. D. ZAMIR (Israel) described NMR studies of the electronic structure of solid and liquid metals and in particular the effect of melting on the electronic structure of copper and aluminium.

Dr. M. BLOOM (Canada) treated NMR and nuclear spin symmetry in molecular solids. Some basic relationships between nuclear spin symmetry and quantum mechanical tunneling in solids were discussed and various methods of measuring tunneling frequencies were reviewed and proposed.

Dr. P. T. NARASIMHAN (India) discussed studies of the determination of electric field gradients for spin  $3/2$  nuclei from NQR measurements. In particular, he dealt with the results for the nuclei  $^{35}\text{Cl}$  and  $^{71}\text{Ga}$  in powder specimen and compared those results with the available single crystal data. Generally a good agreement for the asymmetry parameter values was obtained. Factors that might contribute to disagreement were discussed.

Dr. L. W. REEVES (Canada) gave an account of the application of a recent multisite chemical exchange formulation of the Bloch Equations to intramolecular and intermolecular processes.

Dr. H. G. HERTZ (Germany) discussed intermolecular nuclear relaxation and molecular pair distribution in liquid mixtures. Dr. A. J. VEGA (Israel) elaborated on the pseudocontact contribution to isotropic shifts in paramagnetic molecules and on the effects of the correlation between the orientation of the molecule and its electronic spin state. It was shown that the reaction of the spin system to the molecular thermal motions should be considered. Dr. R. M. GOLDING (Australia) gave a resume of NMR studies of paramagnetic molecules with specific reference to manganese(III) and iron(III) dithiocarbamates.

Dr. A. LOEWENSTEIN (Israel) discussed molecular dynamics in liquids and solutions by NMR relaxation measurements, giving specific examples of studies of a series of simple amines. Dr. D. KIVELSON (USA) discussed ESR linewidths in solution and their anomalous behaviour in hydrogen-bonded liquids, anisotropic rotational diffusion and nondiffusional motions. Dr. S. ALEXANDER (Israel) elaborated on the calculation of ESR line shapes in liquids.

Biologically oriented magnetic resonance studies of proteins and enzymes were dealt with by Dr. W. D. PHILLIPS (USA), Dr. J. J. KATZ (USA), Dr. M. KLEIN (USA), Dr. M. COHN (USA), and Dr. S. I. CHAN (USA). Dr. PHILLIPS talked about NMR studies of the geometrical, electronic, and magnetic structures of the iron-sulfur proteins. Those studies were extremely sensitive to polypeptide conformation and offered opportunities for elucidating phylogenetic relationships, particularly in plants. Dr. KATZ described NMR studies of biopolymers and other complicated compounds of biological importance by the use of compounds of unusual isotopic composition that could be obtained by biosynthesis. Dr. KLEIN gave a talk on solution conformation and amide hydrogen exchange in ferrichromes. Dr. COHN discussed magnetic resonance studies of active sites of enzymes with paramagnetic probes. Dr. CHAN discussed nuclear resonance in membrane biophysics.

Dr. B. VENKATARAMAN (India) discussed electron spin lattice relaxation in organic free radicals. Specific examples of studies of organic free radicals of the semiquinone type were given. Dr. R. J. MYERS (USA) described an electron paramagnetic resonance study of hydrated transition metal ions in  $\text{ZnSeO}_4 \cdot 6\text{H}_2\text{O}$ .

Dr. E. L. HAHN (USA) discussed the role of NMR concepts in pulsed laser phenomena. He showed how the basic ideas of the dynamics of NMR could be applied to electric dipole resonance transitions and dwelt on the macroscopic optical coherence phenomena.

At the closing session of the Symposium it was announced, in the name of the International Society of Magnetic Resonance, that the next Symposium in this series would be held in January or February 1974 in Bombay. Dr. VENKATARAMAN from India invited the delegates to attend the V International Symposium.

D. FIAT

### 1971 PRAGUE MICROSYMPOSIA ON MACROMOLECULES

The Prague Microsymposia on Macromolecules had already acquired their place among numerous scientific meetings dealing each year with macromolecular topics. As in preceding years (the first Microsymposium was held in 1967), this year too, the four days of each Microsymposium were divided into three approximately equal parts, namely, main lectures, short communications, and discussions. In particular, the discussion sessions devoted to subjects conceived in a rather general manner had become a characteristic feature of the Prague Microsymposia.

### VIII IUPAC Microsymposium: Morphology of Polymers 30 August-2 September 1971

This was attended by 177 active participants (14 from overseas) and 22 accompanying persons from 21 countries. The programme contained 8 main lectures (see below) and 50 short communications in five thematic groups. The discussion subjects were as follows: (a) Formation of supermolecular structures, (b) morphology of crystalline polymers, (c) morphology of amorphous polymers, (d) effect of morphology on physical properties of polymers, (e) morphological changes caused by physical treatment.

At the beginning of his opening lecture Prof. A. KELLER (UK) mentioned that since 1952, when in defiance of the prevailing opinion he introduced into the literature the term *morphology of polymers*, this was the first time that an international conference was held under such name. The lecture itself was devoted to some new methods and results of investigation of the morphology of polymer crystals. The first part of the lecture outlined the possibility of an investigation of the substructure of lamellae from diffraction patterns; the second part demonstrated the importance of chemical degradation for a qualitative detection of fluctuation of the folded chain period and for a quantitative determination of the lamella thickness. The third and final part of the lecture contained an explanation of the contrast formation during observation of ultrathin sections of ring spherulites under an electron microscope, based on dimensional changes in the polyethylene monocrystals.

A study of the influence of crystallization conditions on the formation of monocrystals was the subject of the lecture presented by Prof. A. NAKAJIMA (coauthor, Dr. F. HAMADA; Japan). Using vast experimental material, the authors demonstrated the effect of solvent, molecular weight of polymer,



and crystallization temperature on the formation and structure of monocrystals grown from diluted solutions. It was pointed out that the quality of the solvent affected in the first place the equilibrium melting temperature; at the same time, however, it affected the surface roughness of fold portion which related to the numerical value of the surface free energy. Of special interest was the increase in density and thickness of lamellae of monocrystals of sharp low-molecular weight polyethylene fractions crystallized at low sub-cooling.

Formation of supermolecular structures in thin films obtained by polymerization in a glow discharge was dealt with by Prof. M. KRYSZEWSKI (Poland). The originally supposed amorphous character of these layers was not confirmed; on the contrary, all the organosilicon polymers exhibited supermolecular structures, probably arising either during polymerization or immediately after. The formation of these structures was important for explanation of the electric properties of layers.

The results of the investigation of extended chain crystals of linear high polymers obtained during the last ten years were summarized in the lecture presented by Prof. B. WUNDERLICH (USA). He analyzed two possibilities of formation of the extended chain crystals, namely, via the chain folding stage followed by extension in the solid state, or by crystallization during polymerization. The crystals formed by the former process had lamellar habit, those crystallized during polymerization often showed fibrillar habit. Their properties were shown to be close to the extrapolated equilibrium properties. The lecture was received very favourably, despite some confused points in the interpretation of formation of the crystals via the first process.

Morphology of amorphous polymers and the influence of thermal and mechanical effects on this morphology was dealt with in the lecture by Prof. G. S. Y. YEH (USA). Using polystyrene, polyethylene terephthalate, and natural rubber as examples, the author showed that the amorphous homopolymers also exhibited the morphology of the liquid crystal type, the modular structure having dimensions approximately 100 Å. Various models proposed for the amorphous state of polymers were discussed.

The lecture of Prof. E. H. ANDREWS (UK) was devoted to the influence of morphology on the mechanical properties of crystalline polymers. Samples of *trans*-polychloroprene, *cis*-polyisoprene, and polyethylene having different morphology (from spherulitic to fibrillar) were used for the stress-strain measurements; some related mechanical parameters, such as initial moduli, yield stress, and fracture stresses were correlated with the morphology. Simple but physically realistic two-phase models appeared to be able to explain a great number of observations.

Prof. M. MATSUO (USA) related the microphase structure and mechanical properties of plastics-rubber systems. The author studied morphology and dynamic mechanical properties of various types of mixture of plastics and rubbers obtained by casting from solution or by compression moulding. He used the vast experimental material obtained by these measurements to document the effect of composition and preparation conditions on morphology and properties. In the discussion which followed, the speakers appreciated the lecture particularly from the viewpoint of technology of production of tough materials.

An analysis of the effect of annealing and temperature on the morphological structure of polymers was given in the lecture by Prof. E. W. FISCHER (GFR). The main stress was placed on the mechanism of isothermal thickening of monocrystalline lamellae, which was observed during heating above

the critical temperature and proceeded faster with increasing annealing temperature. The recent results supported the theory of partial melting and new crystallization against the original diffusion theory of thickening. The author's conception—as was appreciated in the discussion—also explained some special features of melting of polymers and changes in their physical properties.

## **IX IUPAC Microsymposium: Thermodynamics of Interactions in Polymer Solutions**

**6-9 September 1971**

This was attended by 164 active participants (14 from overseas) and 17 accompanying persons from 22 countries. Eight main lectures and 56 short communications were presented in five thematic groups. The discussions were devoted to the following topics: (a) Effect of molecular size and shape on polymer-solvent interaction, (b) interactions in dilute polymer solutions, (c) specific interactions and hydrophobic bonds, (d) general discussion.

The Microsymposium was opened by an introductory lecture presented by Prof. P. J. FLORY (USA) and dealing with the thermodynamic behaviour of solutions of rigid rodlike macromolecules, in which the effects of entropy connected with orientation of disperse particles led to phase separation accompanied by formation of anisotropic tactoid phases. This theory, which had been known for a comparatively long time, was nowadays being confirmed by experimental data obtained with helix-forming macromolecules whose all-helix conformation seemingly behaved as a rigid rod.

Also the lecture by Prof. D. PATTERSON (Canada) was devoted to the problem of the effect of particle shape and size on solution interactions. It was an aspect which was very much up to date and largely investigated, namely, Prigogine's structural effect and its relations to the combinational and energetic effects. A demonstration was made of interesting consequences of the above effect, such as the existence of the lower critical solution temperature (LCST), a special shape of binodals in the binary system polymer-nonsolvent and a very marked effect of pressure on the compatibility of the polymer with the solvent, the second virial coefficient, and the size of the coil in regions not too remote from LCST.

In the first of the two lectures about the dilute polymer solutions Prof. E. F. CASASSA's (USA) main interest was concentrated on the second virial coefficient. He outlined the way of deriving rigorous series expansions based on the perturbation theory and passed on to various approximate approaches which yielded closed expressions for the second virial coefficient. He carried out a comparison between the experimental and theoretical conclusions for linear and branched chains and for binary mixtures of both types.

The main stress of Prof. H. YAMAKAWA's (Japan) lecture was placed on the problem of excluded volume in a polymer chain. He referred to progress in the search for an exact asymptotic solution for an infinitely long chain with a large excluded volume, on the one hand, and in the search for closed expressions for the expansion coefficient of the coil, on the other. He also offered a critical evaluation of the agreement of various theories with experimental data and pointed out difficulties involved in evaluation of the binary cluster integral.

The next two lectures were devoted to an experimental investigation of the effect of specific interactions on conformation in polypeptide molecules

and their low-molecular weight models. Prof. J. NÉEL (France) studied the conformational structure of dipeptides as model compounds using IR and NMR methods and measurements of dipole moments. The influence of side substituents on the conformational structure was followed systematically, especially with regard to the possibility of formation of five- and seven-membered rings via hydrogen bonds. The speaker also discussed the stabilization of these cyclic structures due to formation of an additional ring with participation of specific interactions of further atoms of the side groups, e.g., in the serine, S-ethylcysteine, and phenylalanine derivatives.

Prof. O. B. PTITSYN (USSR) related the thermodynamic parameters of helix-coil transitions in aqueous solutions of synthetic polypeptides calculated from the combined data of the titration curves, ORD, and intrinsic viscosity. He compared the magnitudes of the entropic and enthalpic terms and considered the possibilities of finding some more detailed molecular-structural interpretation of the transition. In conclusion, he discussed the use of data on synthetic polypeptides to predict the secondary structure of globular proteins from their primary structure.

Prof. M. L. HUGGINS (USA) presented the highlights of his new theory of polymer solutions and pointed out the relationships resulting therefrom for the concentration dependence of the enthalpic and entropic parts of the interaction parameter  $\chi$ . According to his concept, the entropic part of the parameter consisted of a correction of the combinational entropy caused by nonrandom mixing and of a contribution of the orientational and vibrational randomness. Theoretical equations were used to correlate some selected experimental data.

A quite different view of the thermodynamic theory of polymer solutions could be gathered from the lecture by Prof. J. L. LUNDBERG (USA), dealing with clustering functions. These functions had been derived from cluster integrals common in the statistical mechanics of dilute gases; they could be determined by differentiation from experimental or model theoretical dependences of the solution activities upon composition, and were a sensitive indication of the tendency towards clustering of molecules of the same kind or of different kinds. The functions could therefore be regarded as a refined, although so far neglected means for interpretation of the mechanism of sorption and mixing phenomena.

It could be said that both Microsymposia were a meeting place for prominent world scientists working in the respective branches of macromolecular science. Owing to the high standard of lectures and communications, as well as to the vivid discussion, both meetings not only fulfilled their official mission but provided a welcome opportunity for an informal exchange of ideas and experiences. The main lectures are in course of publication in *Pure and Applied Chemistry* (scheduled Vol. 31, Nos. 1-2, 1972), official journal of IUPAC. They will also be available as a specially bound reprint.

B. SEDLÁČEK

## INTERNATIONAL SYMPOSIUM ON CHEMICAL EDUCATION

São Paulo, 30 August-3 September 1971

The Symposium, sponsored by IUPAC and with the collaboration of the University of São Paulo and the Brazilian Academy of Sciences, was held at the University of São Paulo. It was truly international in character. Of



the 113 participants, 34 came from abroad, representing 14 countries: Argentina, Australia, Chile, Columbia, Costa Rica, France, Germany, Israel, Mexico, Paraguay, Peru, UK, USA, and Venezuela. In addition, travel grants from universities and private institutions made possible the attendance of a group of professors of secondary education and university students, totalling 83 who came from as far south as Porto Alegre and as far north as Fortaleza. There was an inaugural address by Prof. G. S. HAMMOND (USA) and five invited papers introductory to the five sessions into which the Symposium was divided.\* In addition, 22 other papers were presented.

After welcoming remarks by Prof. O. MARQUES DE PAVIA, Vice Rector of the University and some additional comments by Prof. R. W. PARRY (USA) who represented IUPAC, Prof. HAMMOND gave the inaugural address. Noticing that the Symposium programme offered an opportunity to discuss chemical education all the way from the lower school to the university, he appealed for a more realistic orientation of teaching at all levels, the present practices being dictated by a tradition which had not examined what were the aims of the educational process or the goals of the students, particularly at a time of great uncertainties. There must be a rational connection between our teaching and the real needs of our students. Much of our shortcomings, he pointed out, were caused by a rigid paternalism, or intellectual dogmatism which tended to be perpetuated in our younger teachers. There was the belief that a rigorous classical chemical education would enable the student to think any problem to a clearcut conclusion. There seemed to be a tendency to embark in 'rigorous', tedious mathematical excursions and to accept without question any proposed model, a situation which pointed to our most serious problem: a lack of a clear knowledge on the part of many teachers, of the values and limitations of the topics they taught, a lack of confidence to state such limitations, a failure to evaluate theory and a failure to show why 'basic' principles should be considered so. There was need for new instructional materials, in the form of unlike textbooks, essays, *etc.*, and to cease thinking that everything we taught was indispensable. Further, we had to recognize the need to work with people from other fields while discussing complex chemical problems facing the human race.

Prof. M. MADRAZO G. (Mexico), in introducing the topic on *Articulation of Chemical Education between High School and First-year University*, again appealed for a rejection of tradition. In many places the different levels of education were rigidly separated in terms of goals and contents, often giving the impression of being derived from the social order (the three-fold division of lower, middle, and upper classes). Rather than discussing the ideal content of a learning process the structure of which must not be changed, what we should be considering were real modifications of the existing structures. He indicated that the problem of mass education had been misunderstood. Schools should not attempt to provide encyclopaedic information; they should not stress 'informing' but 'forming', so that the individual might find his proper place in a society characterized by change. To ask what chemistry should be taught in secondary school to prepare for college was in such context rather meaningless. What we should rather ask was, what training should an 18 year-old require to be useful to society (even if he later on entered professional studies). At all levels we should clearly define aims, both horizontally and vertically. Thus, in primary education, the natural sciences should provide the means for the pupil to learn to observe, measure, and

\*These six papers are scheduled for publication in *Pure and Applied Chemistry* 31 (3), (1972).

experiment and to express the results. In high school each subject (including chemistry) should be presented in balance with others. In high school, classroom and laboratory should provide a common basic cultural background in the sciences, and it should include some shop training. It should include both theory and practice, to make possible both a scientific and humanistic understanding.

The session on the training and preparation of teachers for high school was introduced by Prof. E. C. WATTON (Australia). He reviewed his experiences during a number of years at summer schools for teachers, both in Australia and Asia. Although emphasizing subject matter rather than method, the projects fell rather short of a regular programme, even if the results were considered rather successful. More interest and enthusiasm were promoted in the teachers in those cases where the programme offered greater flexibility and the laboratory sessions involved more of an investigation than a routine demonstration, as at Chulalongkorn University in Bangkok or, when in some of the workshop sessions, specialized techniques could be used and a number of projects designed and followed up, as at the Colombo branch of the University of Ceylon, in 1969. Both experiences demonstrated that there was no better way to interest and get the teacher involved than when the nature of the project promoted inquiry. He then proceeded to describe the training being done at Macquarie University in Australia. Here a formal programme of study on recent developments was combined with project work within an area of interest to the student. Greatest emphasis was placed on the project work, aiming to extend the teacher's chemical experience, for him to make a contribution to the teaching of chemistry and, as far as feasible, an original contribution to research. The programme aimed at the formation of teachers who could be creative and could bring innovations to a curriculum adapted to the local circumstances and resources. Rather than follow handouts, the teacher was given a chance to make a real contribution to teaching, with the consequent enhancement of his self-confidence and self-respect. He suggested that in many developing countries, a collaboration between well-trained school teachers and university departments, not in terms of summer schools but with graduate courses and project work, might help to restore their autonomy, both as chemists and as teachers.

The third topic, dealing with the function of the university in the orientation of teachers was introduced by Prof. H. F. HALLIWELL (UK), who pointed out how the greater demand for education was forcing us to reexamine the principles guiding any change in teaching programmes. There would be in the planning of any national programme areas which would be common with other countries, and others, larger ones, more closely related to local circumstances, both cultural and socio-economic. As a consequence, no single programme was going to have universal application. For any scheme to be effective, it would have to have an inbuilt procedure for adjustment and redevelopment and in its planning and formulation, three questions would have to be kept in mind: To what purpose? With what safeguards for success? By whom should the planning be done? As to the first question we had to decide whether we were going to teach chemistry to the small group of future chemists, or to provide some science education to the bulk of the community. Only clear aims could lead to action, assessment, and adjustment. To ensure its success, any programme would have to take into consideration the many factors, needs, and demands (national, industrial, scientific, of the pupils, *etc.*) which influenced scientific decisions. The planning group should be representative of a variety of interests and knowhow, and made up of at



least four groups: developers, teachers, administrators, and consumers. No single group could succeed alone and the major contribution the university could make was that of encouraging the formation of such groups, helping to supply the needed resources of men and materials and participating as a partner and not as a dominating influence.

Prof. J. D. GÓMEZ-IBÁÑEZ (USA), referring to basic courses in chemistry (mainly first-year university), pointed out that both their content and underlying philosophy had come under heavy criticism and review during the last 10-15 years. The content had tended to swing between two extremes: the one primarily descriptive, the other leaning heavily on 'principles'. The contents of a basic course obviously should be determined by what chemistry was today and should include the basic themes of structure and function, energy and the dynamics of transformation and equilibrium. The vitality of present-day chemistry might be accounted for by the useful interplay of theory and empiricism, and both should find some integration in any basic course. It was important then, to convey clearly the usefulness as well as the limitations of any model. The laboratory work should attempt to develop, as early as possible, an attitude of inquiry. Also it might offer, if properly conceived, the best opportunity to establish the close student-teacher relationship so much needed, particularly with large enrolments. Attempts should be made, whenever possible, to relate chemistry with some of the socio-economic problems of our time, and with borderline subjects. No blueprint for a basic course could be given: its contents, level, and 'awareness' must be determined by the local resources and the context in which it was given.

Prof. E. GIESBRECHT (Brazil) spoke on the topic of *Entrance Examinations for the University*. He made special references to the situation in Brazil, not unlike that existing in some other countries, where a fast-growing number of candidates had to compete for the relatively small quotas at the universities, giving rise to a highly competitive situation. As a consequence, a number of unofficial, private schools geared to training for the taking of entrance examinations had proliferated, thus adding to the complexity of the situation. Postulating that the objective of secondary education was to provide the student with a basic (humanistic and scientific) background, admission to the university should be based on an evaluation of the candidate's broad knowledge and not on his knowledge of a limited number of subjects, determined by the intended field of specialization of each student. He indicated that the student should be evaluated at each stage of his development and objective tests developed.

In a sixth session, sponsored by the Brazilian Academy of Sciences, Prof. P. SENISE (Brazil) described the evolution and present status of graduate studies in Brazil in general. It was expected that the announced legislation regulating graduate studies would be flexible enough to permit the introduction of new and innovative programmes.

Some of the present chemical activities, in terms of curriculum, training of teachers and integration of programmes in Argentina, Brazil, Costa Rica, Peru, and USA, were discussed by participants of the respective countries. Prof. K. J. DIMROTH (Germany) described the programme for the training of high school teachers followed at University of Marburg. The education of chemistry teachers was part of a separate division of the department but better students had an opportunity to continue towards a Ph.D. degree. He also described the structure of the new graduate programme at the same university. Prof. I. ELIEZER (Israel) pointed out the need for a reorientation of graduate studies in view of the process of change taking place in modern



society. Prof. M. LAFFITTE (France) described a new approach to the teaching of chemical thermodynamics. After observing in the laboratory the experimental origin of its principles, it proceeded to the formulation of a 'phenomenologic thermodynamics'. The results of such phenomenologic thermodynamics were then derived from the experimental foundations of quantum and statistical mechanics. The student thus learned the significance of observation and the fruitfulness, as well as the limitations, of scientific concepts.

At the last session homage was paid to the memory of Prof. H. BEHRENS (Chile), whose untimely death on 1 June 1971 represented an irreplaceable loss to chemical education in Iberoamerica.

The discussions following each paper were highly stimulating and informative. There was not a topic concerned with chemical education which did not come under consideration at one time or another. The highlight of the Symposium, and responsible for much of its success, was the participation of the invited students. Both vehemently and with understanding, they expressed eloquently their real concern and involvement in the educational process and made a positive contribution to the discussions. The dialogue between teachers and students was always fruitful and refreshing, and it was felt that students should participate in any future Symposia on chemical education. The handsome auditorium of the Atomic Energy Institute where the sessions took place made possible a very efficient simultaneous translation, and the facilities of the Institute made possible the informal exchange which characterized the Symposium.

J. D. GÓMEZ-IBÁÑEZ

### **III ROMANIAN NATIONAL CONFERENCE ON ANALYTICAL CHEMISTRY**

**Brasov, 22-26 September 1971**

For the first time in Romania, IUPAC sponsored a manifestation of analytical chemistry, namely the III National Conference on Analytical Chemistry. The Conference was organized by the Ministry of Chemical Industry, the Board of Education, and the National Council of Engineers and Technicians, with the assistance of the People's Council of Braşov.

The papers were presented within three sections:

electrochemical methods	— 47 papers
optical methods	— 119 papers
separational methods	— 84 papers.

On a national level, the Conference was attended by 400 specialists from various sectors of activity, especially from industry and education. Also participating were 90 specialists from foreign countries such as Austria, Bulgaria, Czechoslovakia, France, GDR, GFR, Hungary, Italy, Ivory Coast, Poland, Switzerland, UK, USA, USSR, Yugoslavia.

Papers of a high scientific content having an outstanding significance for some fields of analytical chemistry were presented in the plenary sessions by well-known scientists of international reputation. These are in process of being published in the IUPAC journal *Pure and Applied Chemistry* (scheduled Vol. 31, No. 4, 1972), from which a specially bound offprint will also be produced.

I. P. ALIMARIN and T. A. BOLSCHOWA from Moscow University presented new separation and concentration methods by chromatographic extraction.

H. A. LAITINEN from University of Illinois spoke about the analytical electrochemistry of molten salts.

M. FLORESCU, Minister of Romanian Chemical Industry, presented an ample dissertation concerning the role of analytical chemistry in development of the modern chemical industry.

W. KEMULA from the Polish Academy of Sciences and simultaneously President of the Analytical Chemistry Division of IUPAC, showed the progress achieved in chromatopolarography and the possibilities offered by this combined technique to the analytical chemist.

G. VALENSI from University of Poitiers discussed the thermodynamic and operational definitions of ion activities and some applications to pH measurements.

G. POPA from University of Bucharest, President of the Conference Organization Committee, dealt with the development of analytical chemistry in Romania, showing that this activity with numerous original contributions had a tradition of over 100 years.

R. BELCHER from University of Birmingham presented the results of his researches in the determination of some rare anions.

R. A. CHALMERS from University of Aberdeen lectured about precipitation methods in the analysis of traces.

C. LITEANU and S. GOCAN from University of Cluj presented some aspects of chromatography with a solution gradient.

E. PUNGOR and K. TOTH from the Technical University of Budapest exposed the interesting results obtained by application of some ion-selective sensors in potentiometric and titrimetric determination of ions.

G. LUCA from University of Bucharest and GUY BERTHON from University of Poitiers presented a paper on new electrochemical access methods and relative numerical calculation of the stability constants of polycomplexes.

The interest manifested by the participants in these papers as well as those presented within the various sections was evidenced by the numerous discussions, questions, appreciations, and very interesting interventions which kept lively the specialists' attention throughout the whole meeting.

During the Conference, a meeting attended by 65 specialists was also organized on *Methods of Training the Analytical Chemist*. The discussions that were carried on constituted a fruitful exchange of experience on the methods used in various countries for the training of specialists in the analytical chemistry field, both in universities, technical institutes, and post-graduate training. On this occasion, the people from the education field who were concerned with training of the specialists were placed face to face with the people from industry and research who employ such specialists.

During the Conference an exhibition of laboratory equipment was organized, where well-known companies such as Varian—Switzerland, Perkin-Elmer—Austria, Tacussel—France, and Pye Unicam—UK, exhibited their products.

P. G. ZUGRAVESCU

**VIII INTERNATIONAL SYMPOSIUM ON  
CHEMISTRY OF NATURAL PRODUCTS  
New Delhi, 6-12 February 1972**

The latest in this series of successful Symposia was organized by the Indian National Science Academy. Nearly 600 chemists from 29 countries participated and over 300 contributed papers were presented in six sections, covering

the following topics: alkaloids; polyphenolics; terpenoids and steroids; macromolecules of biological interest (proteins, peptides, nucleic acids, etc.); carbohydrates, lipids and related substances; other topics in natural products chemistry including physical methods of structure determination. A book of abstracts of contributed papers was available to the participants at the meeting.

Nine plenary lectures (summarized below) were presented by eminent chemists on the latest developments in natural products chemistry. These lectures will be published in the official IUPAC journal *Pure and Applied Chemistry* and also as a specially bound reprint.

Prof. D. H. R. BARTON, in the opening lecture entitled *Some Aspects of the Chemistry of Penicillin*, explored the possibility of converting penicillins into the related and important cephalosporins. An attractive method of modifying the thiazolidine ring of the penicillins into the six-membered ring of the cephalosporins involved the acid-catalysed rearrangement of the sulphoxide of benzylpenicillin methyl ester. Prof. BARTON had demonstrated the intermediacy of a sulphenic acid in this rearrangement by suitable trapping experiments. The structure and stereochemistry of the acetoxycephan derivatives were established by X-ray study of a representative bearing a heavy atom. A new protecting group for carboxylic acids which could be removed under very mild conditions was developed in connection with this study. This consisted in converting the acid into a hydrazide with 1,2-dialkylhydrazine. These derivatives were quantitatively oxidized by lead tetraacetate to give back the parent acid, the hydrazine residue disappearing as gaseous products.

Prof. H. SCHMID, speaking on *Macrocyclic Spermine and Spermidine Alkaloids*, discussed the isolation and structural elucidation of a number of these lactam alkaloids consisting of a combination of substituted long-chain fatty acids or cinnamic acids with the bases spermidine and spermine.

The alkaloids discussed in detail included oncinotine and isoocincotine from *Oncinotus nitida*, inandenine-ones from *Oncinotus inandensis*, and chaenorrhine from *Chaenorrhinum origanifolium*. Alkaloids of this very interesting type did not appear to be confined to any particular plant family. Their isolation presented formidable difficulties because of their highly polar nature. The structures were established by hydrolysis, Hofmann degradations, and very extensive mass spectral fragmentation studies on the original alkaloids as well as their degradation products. In some cases like oncinotine and isoocincotine, the structures were confirmed by synthesis. Prof. SCHMID also described briefly the chemistry of the closely related alkaloids palustrine, palustridine, lunarine, lunaridine, codonocarpine, pithecolobine, and home-line.

Prof. A. J. BIRCH, in his lecture on *Biosynthetic Pathways in Chemical Phylogeny*, discussed the greater significance of biosynthetic pathways rather than of individual structures in considerations of taxonomy and chemical phylogeny. The elaboration of secondary metabolites from a primary metabolic pool of small molecules involved stages requiring enzymes which were determined genetically. Mutations of a gene might destroy enzyme activity entirely or alter its structure specificity. Breakage of a route might make available substances which, if fairly fundamental, e.g., acetyl coenzyme-A from arrest of a polyketide, might be shunted into a completely different route which hitherto had competed badly. If a more specialized substance such as a diterpene resulted, it might be accumulated or modified by processes like oxidation or cyclization in ways not associated with the original route.



In considering the significance of a given compound, its known or deducible place in a sequence must be assessed. Prof. BIRCH discussed the biogenesis of  $C_6-C_3$  compounds, anthocyanidins, rotenoids, and diterpenes in the light of these concepts.

In his lecture entitled *Some Recent Studies on the Metabolites of Fungi and Lichens*, Prof. S. SHIBATA described the isolation and structural elucidation of the anthraquinone pigments from *Penicillium islandicum*, *P. rugulosum* and some other related fungi. The unusual cage-like structures of the hepatotoxic (—) luteoskyrin, (—) rubroskyrin, (+) rugulosin, and their analogues were elucidated by degradation and application of NMR spectral analysis. The absolute stereochemical structures of these fungal colouring matters were established on the basis of the X-ray crystallographical analysis of a bromination product of (+) tetrahydrorugulosin. The photoreaction of (—) luteoskyrin and the structure of the product, lumiluteoskyrin, were discussed. (—) Flavoskyrin had now been proved to be a modified bianthraquinone. An unusual dimerization reaction of the dihydroanthraquinones, which were synthesized as model compounds for flavoskyrin, was also discussed. (+) Rugulosin, a skyrin, and some modified bixanthenes had also recently been isolated from some lichens.

Prof. E. R. H. JONES, in his lecture on *Microbiological Hydroxylation of Steroids and Related Compounds*, described the utility of this technique in functionalizing unactivated carbon atoms. He discussed the pattern of hydroxylation of a variety of hydroxy- and keto-steroids with the micro-organisms *Calonectria decora*, *Rhizopus nigricans*, and others. Nearly a hundred steroid substrates, having 3-, 11- and 17-oxygen functions, were treated with *Calonectria decora*. In dihydroxylations, the two hydroxyl groups were introduced on carbon atoms approximately 4 Å apart, their distances from the carbonyl or other 'directing' group varying somewhat more indefinitely. Dioxygenated substrates were more readily attacked and single hydroxyl groups were generally introduced. The overall picture was that of the dominant polar group becoming associated with a hydrophilic region of the hydroxylating enzyme system and thereby determining the orientation in which the steroid was presented at the complementary hydrophobic sites on the enzyme complex where hydroxylation occurred. This explained why the groups in rings A and D directed in opposite senses, and why they were more effective than those in the central rings. *Rhizopus nigricans* was found to introduce  $C_{11}-\alpha-OH$  on 3-ketosteroids and  $C_7-OH$  in the absence of the 3-keto group. The emerging picture of the enzyme system here was of three centres in a very symmetrical arrangement [3, 11 and 16  $\equiv$  3, 7 (or 6) and 16].

Prof. N. K. KOCHETKOV, in his lecture *Some New Trends in the Chemistry of Polysaccharides*, pointed out the importance of the study of these macromolecules. Of prime importance in the structural elucidation of polysaccharides was the necessity of finding methods for their specific cleavage into oligomeric blocks. Among novel methods to carry this out, Prof. KOCHETKOV mentioned the use of Hofmann rearrangement of uronic acids and the solvolysis of arylsulphonyl derivatives. Much information on the structure of the oligosaccharides and the monomers could be had by studying their mass spectra.

The second part of the lecture was devoted to the development of synthetic methods for building up polysaccharides of predetermined structure. The author described ways of enhancing the reactivity of both the aglycone hydroxyl and the anomeric carbon for the polymerization reaction. The use of *ortho*-esters in particular was very rewarding and permitted the synthesis

of a variety of oligo- and polysaccharides. The modification of linear polysaccharides into branched polysaccharides was another attractive possibility. This was realized in the case of cellulose diacetate which was converted into a branched glucane.

In his lecture intriguingly entitled *Samsara of Organic Carbon*, Prof. G. OURISSON spoke about the results of his investigations in the new and developing field of organic geochemistry. Prof. OURISSON described his investigations on the organic chemicals present in the sediments found near Strasbourg, Messel, and Bouxwiller. Sensitive analytical methods like the use of capillary column gas-chromatography coupled with mass spectrometry were developed and extreme precautions had to be taken to avoid contamination. A variety of lipids were isolated and identified: hydrocarbons, acids, esters, polycyclic hydrocarbons, alcohols, and ketones. The most informative results were obtained with acyclic and polycyclic isoprenoids. These compounds served as 'messages' useful in deciphering paleotaxonomy, paleobiochemistry, and paleoecology. As organisms died, their organic matter decayed and their carbon returned to carbon dioxide. Recycling was accomplished by photosynthesis. A small portion of organic matter, however, escaped and was buried with carbonates or silicates in sediments. It was preserved until orogenesis and erosion brought it back to the surface. A study of these could help us to reconstruct the conditions prevailing at the time of sedimentation and help us to understand the chemical activities of the early living organisms.

Prof. H. UMEZAWA, in his lecture on *Chemistry of Enzyme Inhibitors of Microbial Origin*, reported that this novel approach to the screening of culture filtrates of microorganisms had led to the isolation of new types of compound with interesting structures and activity. The chemistry of several inhibitors of proteolytic enzymes, tyrosine hydroxylase, and dopamine  $\beta$ -hydroxylase and their biological activity were discussed. The compounds described included the peptides, leupeptin and pepstatin, which inhibited proteases and pantoic acid which was active against virus sialidases. The cyclopentanedione derivative, ouidenone, isolated from a mushroom culture, and several analogues were synthesized and found to have anti-hypertensive activity. From *Fusarium* fungi was isolated the dopamine  $\beta$ -hydroxylase inhibitor, fusaric acid, a 5-alkylpicolinic acid. This and other analogues had been shown to have hypotensive activity and also a potential to cure alcoholism. Dopastin, isolated from bacteria grown on a mushroom, was shown by degradation to be a crotonyl derivative of an amine containing a nitrosohydroxylamine side-chain.

In the concluding plenary lecture entitled *Synthesis of Vitamin B<sub>12</sub>*, Prof. R. B. WOODWARD announced the much-awaited total synthesis of vitamin B<sub>12</sub>—a historic feat crowning almost a decade of work carried out in collaboration with Prof. A. ESCHENMOSER and his group at Zürich. Prof. WOODWARD briefly recounted the achievements towards this goal that had been reported at the VII Symposium at Riga in 1970. At that time, the A/D rings had been linked to the B/C portion to yield heptamethylbisnorbocobyrinate. The introduction of two nuclear C-Me groups at C<sub>5</sub> and C<sub>15</sub> and the differentiation of one carboxyl in ring D from the other six ester functions were the tasks left to be tackled.

The differentiation problem was solved ingeniously by carrying out the ring-opening of  $\beta$ -cornnorsterone with a mixture of methanol and phenyl mercaptan to yield, ultimately, a thioester. This was converted to a nitrile group in the A/D building block. Condensation of the nitrile with 'thio-



dextrin', the B/C portion, yielded a thioester from which the sulphur was extruded to yield cyanocorrigenolide in which the rings D and C had been attached through a carbon atom. This was converted into a dithio derivative, S-methylated and treated with dimethylamine to yield an amide in ring B with an exocyclic methylene group. Cobaltation followed by cyclization, displacing the S-methyl group, resulted in the one-carbon linkage between rings A and B to yield 'cobyric acid a,b,d,e,g-pentamethyl ester c-dimethylamide f-nitrile'.

The dimethylamide, on oxidation, yielded a lactone on ring B. Treatment of this with chloromethyl benzyl ether followed by conversion to the bis-mercaptan and reduction resulted in the introduction of methyl groups on C<sub>5</sub> and C<sub>15</sub>. The 'f-nitrile' was hydrolysed to the 'f-amide' which was converted into the 'f-acid'. Aminolysis yielded cobyrinic acid, identical with an authentic sample. Since cobyrinic acid had earlier been converted into vitamin B<sub>12</sub>, the above sequence constituted a total synthesis of this complex vitamin.

T. R. GOVINDACHARI

## **IV INTERNATIONAL FERMENTATION SYMPOSIUM**

**Kyoto, 19-25 March 1972**

This Symposium was the fourth scientific gathering of its kind, following those held in 1960 (Rome), 1964 (London), and 1968 (New Brunswick). It was jointly sponsored by IUPAC, the Science Council of Japan, and the Society of Fermentation Technology (Japan), in cooperation with the International Organization for Biotechnology and Bioengineering and the Agricultural Chemical Society of Japan, and was held at the Kyoto International Conference Hall.

The purpose of the Symposium was to provide a forum for presentation of the most recent scientific information and for scientific discussion on the present status and future prospect of industrial fermentations. Chairman of the Organizing Committee was Prof. G. TERUI (Osaka University), President of the Society of Fermentation Technology (Japan). This international event was attended by 1,013 active members from 45 different countries, accompanied by 78 wives and children. Among these, 365 scientists were from abroad including 12 trainees from developing countries. From the first to the fourth, the International Fermentation Symposium had been essentially a symposium on fermentation technology. The size and scope of fermentation technology have undergone a tremendous metamorphosis in recent years due to the impact of new developments in biological sciences and discoveries of novel useful chemical activities of microorganisms on the one hand and the introduction of modern engineering sciences on the other. In organizing this Symposium, emphasis was laid on the recent progress of the related fields of science, both fundamental and engineering. Twenty focal topic sessions and 16 general paper sessions covered subjects not only those directly related to such world problems as single cell protein and microbiological waste treatment, but also fundamental problems of microbial physiology and biochemical engineering. A few topics on yeasts were incorporated into this Symposium in accordance with the request of Dr. T. O. WIKEN, Chairman of the IAMS Commission for Yeasts and Yeast-like Fungi.

The opening lectures were given as follows: Dr. K. SAKAGUCHI (Japan)—*Historical Background of the Fermentation Industries in Japan*; Prof. A. E. HUMPHREY (USA)—*The Role of Fermentation Technology in Modern Society*.



The closing lecture was given by Prof. H. UMEZAWA (Japan) on *Recent Studies on New and Extended Areas of Antibiotics*.

The themes of focal topic sessions were (1) fermentation dynamics; (2) mass transfer and scale-up; (3) continuous culture; (4) instrumentation for process control; (5) genetics applied to process improvement; (6) amino acids and nucleic acid-related substances by fermentation; (7) microbial enzymes; (8) water-insoluble enzyme derivatives; (9) physiologically active substances by fermentation; (10) biomass from noncarbohydrate organic substances; (11) utilization of autotrophic microbes; (12) microbial waste treatment; (13) recent progress in traditional fermentation; (14) tissue culture; (15) novel fermentation products; (16) enzymes active in hydrolyzing cell-wall and related substances; (17) process design and product recovery; (18)-(20) topics on yeasts. In focal topic and general paper sessions, 130 and 202 papers, respectively, were presented.

At the closing ceremony, Dr. A. F. LANGLYKKE (USA), Chairman of the Fermentation Industries Section of IUPAC, presented a paper on *International Collaboration in Fermentation Research*, followed by a lecture by Prof. H. G. GYLLENBERG (Finland) on the subject *Fermentation and Development: An Evaluation of the Approach of the International Organization for Biotechnology and Bioengineering*. The participants accepted the kind invitation of the Institut für Gärungsgewerbe und Biotechnologie to arrange the next International Fermentation Symposium in Berlin, four years hence.

G. TERUI

## INTERNATIONAL CONGRESS ON ANALYTICAL CHEMISTRY

Kyoto, 3-7 April 1972

The Congress was organized by the Japan Society for Analytical Chemistry under the sponsorship of IUPAC and the Science Council of Japan and held at the Kyoto International Conference Hall. More than 700 delegates, of whom 151 came from 23 overseas countries, participated and 274 papers were presented in the following six sections: electrochemical analysis, spectrometric analysis (including X-ray, mass, and atomic absorption spectrometry), radiochemical analysis, chromatography, organic analysis and other methods (including solvent extraction, titration, precipitation, and gas analysis). In addition eleven special lectures were delivered by specially invited lecturers:

T. SOMIYA (Japan)	Analytical Chemistry in Japan
R. BELCHER (UK)	Application of Chelate Compounds in Analytical Chemistry
G. CHARLOT (France)	Sur l'Analyse des Réactions en Milieu Non-Aqueux au Moyen des Méthodes Électro-chimiques
P. W. WEST (USA)	Analytical Studies of the Environment
A. J. P. MARTIN (UK)	Problems of Detection
W. J. KIRSTEN (Sweden)	Developments in Quantitative Organic Ultra-micro Elementary Analysis

E. PUNGOR (Hungary)	Precipitate Based Ion-selective Electrodes: Their Theory and Application
H. KAISER (FRG)	Guiding Concepts Relating to Trace Analysis
W. W. MEINKE (USA)	Is Radiochemistry the Ultimate in Trace Analysis?
I. P. ALIMARIN (USSR)	Kinetics of Complex Formation of Metals with Organic Ligands in Analytical Chemistry
A. WALSH (Australia)	Nondispersive Systems in Atomic Spectroscopy

The special lectures are being published in *Pure and Applied Chemistry*, official journal of IUPAC.

M. SENDA

## **FORTHCOMING IUPAC-SPONSORED SYMPOSIA**

### **INTERNATIONAL SYMPOSIUM ON CONTROL OF MYCOTOXINS**

**Kungälv, Göteborg, 21 and 22 August 1972**

The Symposium is sponsored by IUPAC and the Swedish National Committee for Chemistry and organized by the Food Contaminants Commission of the IUPAC Food Section. The emphasis will be on mycotoxins other than aflatoxins which are coming to light as potential hazards to man and animals. However, certain special aspects of the aflatoxins are also pertinent subjects of this Symposium. The language of the meeting will be English. Publication of papers will take place in the official journal of IUPAC *Pure and Applied Chemistry* or in a supplement to it.

Kungälv is a small city, more than 1000 years old, with a famous medieval castle on the river Göta Älv, about 10 miles from Göteborg. The distance to the airport of Göteborg is some 14 miles. Accommodation has been reserved at the Hotel Fars Hatt, a frequently used conference centre. It is on the way to the well-known archipelago of the Swedish west coast.

All correspondence should be directed to the Congress Secretariat:

Mycotoxin Symposium  
c/o Svenska Institutet för Konserveringsforskning  
Källeback, Fack  
S-400 21 Göteborg 16  
Sweden

### **II DISCUSSION CONFERENCE: MACROMOLECULAR MATRICES AND CARRIERS OF BIOLOGICAL FUNCTIONS**

**Prague, 21-24 August 1972**

#### **Topics**

Synthesis of (bio)macromolecules on matrices  
Matrices and (bio)catalysis  
Matrices and energy conversion  
Matrices and specific interactions of (bio)macromolecules (including sensory, antigen-antibody and other mechanisms)  
Macromolecular carriers with (bio)active agents

The aim of this Conference is to contribute to the exchange of ideas and experience between scientists working in molecular biophysics (biology, biochemistry) and macromolecular physics (chemistry, physical chemistry). This dialogue should lead to a better understanding of the architecture and functions of matrices and carriers (very complicated natural and not simple artificial systems). The goal of the Conference is to survey some general principles of the function of matrices and carriers in starting and controlling biologically important reactions and processes. However, not only a review of the actual knowledge is expected in this field: first of all, the stimulation



of new ideas and experiments leading to 'imitation' of some biological systems and functions is of primary importance for further progress in the 'bioanalogical' branch of macromolecular science—remembering at the same time that mainly 'modelling at a great distance' and combination of natural and artificial systems might have a good chance to be successful.

This Conference follows the IV International Biophysics Congress of IUPAB (Moscow, 7–14 August 1972) and precedes the X IUPAC Prague Microsymposium (see p. 56).

### Scientific Programme

The scientific programme consists of invited lectures and of discussion contributions only; the usual short communications will not be presented. The programme seems to be rather broad and dealing with the major part of molecular biophysics: in the lectures and discussions, however, mainly those aspects will be stressed which are specific for matrices and carriers—in the first place, the role of geometric and 'unit sequence' factors in reactions and processes. These factors are related not only to the molecular level of matter, but also to the sub- and supermolecular levels. All types of system (both natural and artificial) will be discussed if they are consistent with the aim of this Conference.

About 12 lectures will be given, including:

M. LENG and CH. SADRON (France)	Polycondensation of Mononucleotides on a Polynucleotide Chain
K. MOSBACH (Sweden)	Enzymes Bound to Artificial Membranes
A. OPLATKA (Israel)	Mechanochemical Proteins in Three Dimensional Matrices
C. G. OVERBERGER (USA)	
B. ROSENBERG (USA)	
E. SELEGNY (France)	
I. TASAKI (USA)	Macromolecular Basis of Nerve Excitation
M. V. VOLKENSHTEIN (USSR)	Electronic-Conformational Interactions in Molecular Biophysics
G. WEBER (USA)	
O. WICHTERLE (Czechoslovakia)	Synthetic Carriers of Bioactive Agents

The discussion contributions are expected to be of two types:

- (a) questions and comments (to invited lectures and to other contributions);
- (b) thematic contributions (to the Conference topics).

### Publications

The abstracts of invited lectures and discussion contributions will be published as a supplement to the Programme. No other Conference materials are foreseen; authors are entirely free to decide where to publish their lectures or contributions.

### Conference Secretariat

All enquiries should be sent to:

Institute of Macromolecular Chemistry  
Czechoslovak Academy of Sciences  
Petržiny 1888, Praha 616, Czechoslovakia

# **1972 PRAGUE MICROSYMPOSIA ON MACROMOLECULES**

## **X MICROSYMPOSIUM: CONFORMATIONAL STRUCTURE OF POLYMERS**

**28-31 August 1972**

### **Topics**

Theoretical prediction and interpretation of conformational structure and conformational transitions of polymers  
Experimental methods for studying conformational structures and their dynamics in polymers  
Conformational structure and internal mobility of synthetic polymers  
Stable conformations and conformational transitions in biopolymers and bioanalogous molecules

### **Lectures**

T. M. BIRSHTEIN (USSR)	
F. A. BOVEY (USA)	Study of Conformations of Polypeptides and Model Oligopeptides by High Resolution NMR
E. M. BRADBURY (UK)	Proton Magnetic Resonance Studies of Conformations and Conformational Transitions of Polypeptides
W. G. FATELEY (USA)	Infrared and Raman Selection Rules for Polymers and Application of Laser Raman Scattering using Circular Polarized Light
M. GOODMAN (USA)	Conformational Analysis of Polydepsipeptides
S. GOTLIB (USSR)	
H. A. SCHERAGA (USA)	Theoretical Calculations of Conformation Energies of Polypeptides and Proteins
T. SHIMANOUCI (Japan)	Local and Overall Vibrations of Polymer Chains
G. ZERBI (Italy)	Vibrational Spectra of Conformationally Impure Polymers

## **XI MICROSYMPOSIUM: MECHANISM OF INHIBITION PROCESSES IN POLYMERS**

### **Oxidative and Photochemical Degradation**

**4-7 September 1972**

### **Topics**

Influence of degradation conditions and of the antioxidant and UV absorber structures on their activity in various polymers  
Transformations of components of the stabilizing system during inhibited oxidation; properties of transformation products  
Participation of antioxidants in partial reactions of inhibited oxidation  
Participation of coloured products of antioxidants transformation in photochemical degradation

Synergism and antagonism in the mixtures of stabilizers  
Influence of other additives and residues of catalytic systems on the properties of antioxidants and UV absorbers  
Influence of compatibility, volatility, and migration of stabilizers on their activity

### Lectures

- |                            |  |
|----------------------------|--|
| A. A. BERLIN (USSR)        |  |
| J. E. GUILLET (Canada)     |  |
| H. J. HELLER (Switzerland) | Some Aspects of Stabilization of Polymers against Light  |
| B. M. KOVARSKAYA (USSR)    | Problems of Stability of Polyethers and Polyesters   |
| H. NAARMANN (GFR)          | Influence of Conditions of Degradation and of Structure of Antioxidants and UV Absorbers on Their Activity in Polymers |
| N. PLATZER (USA)           |  |
| E. SCHRÖDER (GDR)          | Progress in Methods of Analysis of Stabilizers and Products of Their Transformations in Polymers                       |
| G. SCOTT (UK)              | Mechanism of Phosphite Esters as Antioxidants  |

### Scientific Programme of Microsymposia

The main lectures (given above) will be published in *Pure and Applied Chemistry*, official journal of IUPAC. Arrangements have been made for those authors who so desire to publish short communications in *Macromolecules* (X Microsymposium) and *Journal of Polymer Science, Part C* (XI Microsymposium). Discussions will not be limited to the results presented in the main lectures and short communications: discussion contributors are expected for both general and special problems involved in the given thematic fields. English is the preferred language for the meetings.

### Microsymposia Secretariat

All enquiries should be directed for the attention of:

PMM Secretariat  
c/o Institute of Macromolecular Chemistry  
Czechoslovak Academy of Sciences  
Petržiny 1888, Praha 616  
Czechoslovakia

### I INTERNATIONAL SYMPOSIUM ON ADVANCES IN MICROBIAL ENGINEERING

**Mariánské Lázně, 28 August-1 September 1972**

The Symposium is sponsored by the Fermentation Industries Section of IUPAC, the International Organization of Biotechnology and Bioengineering, the Economic and Applied Microbiology Section of the International Association of Microbiological Societies, and the UNESCO-ICRO Panel of Applied Microbiology. It is being organized by the Microbiological Institute of the



Czechoslovak Academy of Sciences, the Chemical Engineering Group of the Czechoslovak Chemical Society, and the Czechoslovak Microbiological Society, in conjunction with the Technical Universities of Prague and Bratislava and the United Pharmaceutical Works SPOFA, at Marienbad (Mariánské Lázně), a pleasant health resort in West Bohemia.

### Scope

The scope of the Symposium is to review for the first time on an international basis that part of research involved in engineering investigations of processes which are essentially microbiological. Nine scientific sessions are planned:

#### Growth Kinetics

1. Mathematical Model Development
2. Application of Kinetics and Data

#### Product Formation

1. Kinetics, Optimization, and Economic Aspects
2. Application of Kinetics to Specific Productions

#### Fermenter Design Fundamentals

1. Hydraulic Fundamentals
2. Mass and Heat Transfer Fundamentals

#### Fermenter Operation and Control

1. Process Analysis and Control
2. Fermentation and Control Equipment

#### Other Operations in Microbial Engineering

Ample time is reserved for discussions, because the Organizers feel it to be rather important in this new and still formulating scientific field. The term microbial engineering was chosen to represent that part of the broader branch which is generally termed *bioengineering*, to distinguish processes which involve engineering aspects of production of and by microorganisms from processes involving medical or food applications.

Apart from scientific sessions where original papers and shorter communications on the above-listed subjects will be presented, two panel discussions are planned in separate sessions:

Single cell protein production

Quo vadis, bioengineering and education in biochemical engineering—present status and future

### Invited Lectures

E. L. GADEN, JR. (USA)	Development and Practical Application of Microbial Process Kinetics
E. O. POWELL (UK)	Hypertrophic Growth
G. TERUI, M. OKAZAKI, A. SHINMYO and S. KINOSHITA (Japan)	Kinetics of Enzyme Production by Microorganisms
V. L. YAROVENKO and B. M. NAKHMANOVICH (USSR)	Kinetics of Product Synthesis in Continuous Alcohol Fermentation
N. BLAKEBOROUGH (UK)	Fundamentals of Fermentor Design
B. ATKINSON (UK)	Role of Microbial Films in Fermentation
L. B. WINEGARD, JR. (USA)	Engineering Aspects of Immobilized Enzymes in Flow Reactors

Z. L. LENGYEL (Hungary)	Controlled Aeration of Fermentation Systems
V. H. EDWARDS (USA)	Tailored Adsorbents for Chromatographic Purification of Enzymes and Other Biological Materials
L. EDEBO (Sweden)	Disintegration of Cells and Protein Recovery

The invited lectures will be published subsequently in the IUPAC journal *Pure and Applied Chemistry*.

### Symposium Language

The only symposium language is English. No provisions are being made for translation of papers into any other language.

### Secretariat

All correspondence should be addressed to:

Dr. Z. ŠTĚRBÁČEK  
Symposium on Advances in Microbial Engineering  
c/o Institute of Microbiology  
Czechoslovak Academy of Sciences  
Budějovická 1083, Praha 4-Krč  
Czechoslovakia

## III INTERNATIONAL SYMPOSIUM ON CAROTENOIDS OTHER THAN VITAMIN A

**Cluj, 4-7 September 1972**

The Organizing Committee has obtained the sponsorship of the Romanian Ministry of Education, the Academy of the Socialist Republic of Romania, and of IUPAC for the Symposium. It will take place in the building of the Institute of Chemistry at Cluj.

The scientific programme will be devoted to structures, synthesis, physical and chemical properties, biochemistry and functions of carotenoids, with the following plenary lectures:

B. H. DAVIES (UK)	Carotene Biosynthesis in Fungi
T. W. GOODWIN (UK)	New Experiments on Carotenoid Biosynthesis in Microorganisms
S. LIAAEN JENSEN (Norway)	Structural Elucidation of Carotenoids—A Progress Report
D. I. SAPOZHNIKOV (USSR)	Role of Violaxanthin Cycle in Chloroplasts and Route to its Formation
B. C. L. WEEDON (UK)	Some Recent Studies on Carotenoids and Related Compounds
O. B. WEEKS (USA)	Photoregulated Carotenogenesis in Nonphoto-synthetic Bacteria

The plenary lectures, but not contributed papers, will be published in *Pure and Applied Chemistry*, the official journal of IUPAC and also made available as a specially bound reprint.

## **Secretariat**

All correspondence should be directed to:

Prof. C. BODEA  
Department of Biochemistry  
Institute of Agronomy  
Str. Mănăştur 3  
Cluj, Romania

## **III NATIONAL CONFERENCE OF PURE AND APPLIED PHYSICAL CHEMISTRY**

**Bucharest, 4-7 September 1972**

The Conference will be based on a small number of invited plenary lectures and on contributed papers by participants. It will be organized in sessions, covering the topics listed below:

1. Quantum chemistry; theory of the chemical bond; molecular structure; reactivity.
2. States of matter; transport phenomena; colloids; chemical kinetics; photochemistry; radiochemistry.
3. Chemisorption; homogeneous and heterogeneous catalysis; catalytic reactions.
4. Chemical thermodynamics; thermochemistry; statistical thermodynamics; thermodynamics of metallurgical processes; thermodynamics of irreversible processes.
5. Electrochemistry; solutions of electrolytes; ionic liquids (molten salts); electrode processes; electrometallurgy; corrosion and anticorrosion protection.
6. Chemical engineering; mass and heat transfer: effect of surface phenomena; kinetics of unit processes; modelling, optimization and automation of processes in chemical industry.
7. Physicochemical analysis; automation of physicochemical analysis and control.

The official language will be Romanian; however, foreign authors will deliver their papers in English, Russian, French or German. No arrangements will be made for simultaneous translation. Papers presented by Romanian authors will have their abstracts published in one of the above mentioned languages.

## **Secretariat**

Further information is available from:

Conferința de Chimie Fizică  
CP 2103  
Bucharest 13  
Romania



# I IUPAC CONFERENCE ON PHYSICAL ORGANIC CHEMISTRY

Crans-sur-Sierre, 4-8 September 1972

At the XXV IUPAC Conference in Cortina d'Ampezzo (1969) it was proposed by the Organic Chemistry Division to initiate a regular series of IUPAC Conferences on Physical Organic Chemistry which would be held every two years, starting in 1972. The International Committee formed for this Conference decided that the First Conference, which is cosponsored by Comité Suisse de la Chimie and the Swiss Chemical Society, should concentrate on important developments in the following topics:

- A—New methods for the elucidation of structure of unstable intermediates, including biradicals
- B—Solvent-solute interactions
- C—Reaction mechanisms of organometallic compounds

The following scientists have accepted invitations for plenary lectures in the three topics mentioned above:

## *Topic A*

- |  |   |
|--|---|
| J. I. BRAUMAN (Stanford University)                  | Applications of Ion Cyclotron Resonance Spectroscopy: Stabilities of Negative Ions in the Gas Phase |
| H. FISCHER (University of Zürich)                    | Chemically Induced Dynamic Nuclear Polarization and Detection of Transient Free Radicals            |
| J. A. POPLE (Carnegie-Mellon University, Pittsburgh) | Structures of Some Unstable Molecules by Molecular Orbital Theory                                   |

## *Topic B*

- |   |  |
|---|--|
| E. M. ARNETT (University of Pittsburgh)                 | Hydrogen Bonding and Acidity   |
| A. E. LUTSKI (Kharkov Polytechnic Institute)            | Dipole Interactions and their Part in the Effect of the Solvent on the Physical Properties of Solute Molecules |
| C. D. RITCHIE (State University of New York in Buffalo) | Solvent Effects on Cation-Anion Combination Reactions  |

## *Topic C*

- |   |  |
|---|--|
| E. C. ASHBY (Georgia Institute of Technology, Atlanta)            | Mechanisms and Stereochemistry of Main Group Organometallic Alkylation Reactions |
| J. HALPERN (University of Chicago)                                | Catalysis of Symmetry-Restricted Reactions by Transition Metal Compounds         |
| G. WILKE (Max Planck Institut für Kohlenforschung, Müllheim/Ruhr) | Catalytic Reactions on Transition Metal Complexes                                |

## *Special Topic*

- |   |  |
|---|--|
| J. N. PITTS (University of California at Riverside) | Correlations of Physical Organic Chemistry with Environmental Problems |
|---|--|

The International Committee decided to invite Prof. PITTS for this special plenary lecture in order to stimulate physical organic chemists to think about

potential contributions of their science to the solution of environmental problems of the present and the future.

Invited lectures will be given in English. Contributed papers may be presented in any commonly-understood language, but the Organizers hope that speakers will use English. No arrangements will be made for translations. It is not planned to publish the lectures in a volume.

### **Correspondence**

Correspondence relating to the Conference should be addressed to:

Prof. H. ZOLLINGER  
Department of Industrial and Engineering Chemistry  
Swiss Federal Institute of Technology (ETH)  
Universitätstrasse 6  
CH-8006 Zürich  
Switzerland

## **III INTERNATIONAL SYMPOSIUM ON MEDICINAL CHEMISTRY**

**Milan, 13-15 September 1972**

The Symposium is being organized by the Italian Society of Pharmaceutical Sciences, under the sponsorship of the IUPAC Section on Medicinal Chemistry, at Milan University.

The scientific programme will include the following nine invited lectures:-

**Topic I—Biochemistry of Microorganisms as a Basis for Rational Development of Antiinfectious Agents:**

- |                    |   |
|--------------------|---|
| D. VAZQUEZ (Spain) | Mechanisms of Selectivity and Action of Protein Synthesis Inhibitors  |
| H. R. PERKINS (UK) | Significance of d-Alanyl-d-alanine Termini in Biosynthesis of Bacterial Cell Walls and Action of Penicillin, Vancomycin, and Ristocetin |
| P. SENSI (Italy)   | Inhibitors of Transcribing Enzymes  |

**Topic II—Synthetic Analogs of Biochemical Messengers:**

- |                       |   |
|-----------------------|---|
| M. NELBOECK (Germany) | Analogs of Cyclic AMP and their Physiological Response                      |
| E. COSTA (USA)        | Synapsis and Catecholamines: Biochemical and Physicochemical Considerations |
| V. ERSPAMER (Italy)   | Active Polypeptides of the Amphibian Skin and their Synthetic Analogs       |

**Topic III—Physicochemical Properties and Biological Action:**

- |                         |   |
|-------------------------|---|
| J. P. CHANGEUX (France) | Characterization, Isolation, and Purification of Cholinergic Receptor of Gymnote's Electric Organ |
| A. CAMMARATA (USA)      | Some Biological Applications of Regular Solution Theory   |
| L. B. KIER (USA)        | Molecular Orbital Studies in Chemical Pharmacology  |

In addition, special contributions have been invited from:

F. ARCAMONE (Italy), S. BERGSTRÖM (Sweden), W. BROCK NEELY (USA), E. CAMPAIGNE (USA), J. M. GHUYSEN (Belgium), K. HEUSLER (Switzerland), W. TH. NAUTA (Netherlands), YU. A. OVCHINNIKOV (USSR), TH. POSTERNAK (Switzerland), W. P. PURCELL (USA), E. SCOFFONE (Italy), J. K. SEYDEL (Germany).

The plenary lectures will be published in the IUPAC journal *Pure and Applied Chemistry* or in a supplement to it. Publication of the special contributions is also being arranged.

### **Secretariat**

For further details, write to:

Prof. A. SOLDI, Segretario Generale  
Società Italiana di Scienze Farmaceutiche  
Via Giorgio Jan 18  
I-20129 Milano  
Italy

## **INTERNATIONAL SYMPOSIUM ON SELECTIVE ION-SENSITIVE ELECTRODES**

**Cardiff, 9-12 April 1973**

This Symposium, under the sponsorship of IUPAC, will be held at the University of Wales Institute of Science and Technology (UWIST) in Cardiff.

### **Programme**

The programme will be devoted to all aspects of selective ion-sensitive electrodes and will include attention to development, operation, mechanism, and applications. A limited number of plenary lectures will be delivered by specially invited lecturers. These will be supplemented by contributed papers for which delivery and discussion will take approximately 30 minutes per paper.

### **Contributed Papers**

Anyone wishing to present a paper should apply immediately for the form of submission of a communication. This completed submission together with the abstract should be returned not later than 1st September 1972 to the Symposium Editor (Dr. G. J. MOODY, Department of Chemistry, UWIST, Cardiff, CF1 3NU, UK).

It may be necessary to be selective in order to accommodate all the desirable papers within the time available.

### **Symposium Language**

The plenary lectures will be given in English. The organizers prefer that contributed papers should also be presented in English since this will be familiar to the majority of the listeners. The Symposium literature will be published in English.



## **Correspondence**

All correspondence should be addressed to the Symposium Secretary:

Mr. D. R. HUB  
Organizer of Short Courses, UWIST  
King Edward VII Avenue  
Cardiff CF1 3NU, UK

## **IV CANADIAN WOOD CHEMISTRY SYMPOSIUM**

**Quebec, 4-6 July 1973**

In recognition of the outstanding success of the three previous meetings in this series, the IV Symposium will be internationally sponsored by IUPAC. It will bring together experts of the world from industry, university, and institutional laboratories. Cosponsors are the Chemical Institute of Canada and the Technical Section of CPPA.

The Programme Committee has selected three main themes:

Conformation of Macromolecules in Wood  
Nonpollutive Pulping and Bleaching Processes  
Cellulose-Polymer Combinations

Authors wishing to contribute papers in the context of the above themes are invited to write to:

Prof. R. H. MARCHESSAULT  
Department of Chemistry  
Université de Montréal  
CP 6128, Montréal 101  
Quebec, Canada

## **SYMPOSIUM ON CONTRIBUTION OF CHEMISTRY TO FOOD SUPPLIES**

**Hamburg, 29-31 August 1973**

The topics will show the role of chemistry for food safety—including determination and control of nonagricultural contaminants in food—and food production—including chemical synthesis and modification of food ingredients, such as proteins, fats, and carbohydrates, areas of common interest between the Applied Chemistry Division of IUPAC and IUFOST who will cosponsor the meeting.

It is hoped to publish the main papers presented as a book. Preprints will not be issued, but all participants will receive abstracts of contributed papers. There will be no official symposium language but all invited lectures will be in English as will be the literature pertaining to the meeting.

A limited number of submitted papers will be considered for presentation at the Symposium by the Programme Committee. Those wishing to submit papers should send details, including a summary of 200-300 words, to reach Dr. A. J. COLLINGS (see below) not later than 1 December 1972.

## Correspondence

All correspondence relating to the meeting should be addressed to:

Dr. A. J. COLLINGS  
Environmental Safety Division  
Unilever Research Laboratory  
Colworth House, Sharnbrook  
Bedfordshire, UK

## XXIV IUPAC CONGRESS

**Hamburg, 3-8 September 1973**

The Organizing Committee is pleased to announce the following developments in the general scientific programme:

### *Section 1 High Polymers*

Plenary lecture—

G. J. SMETS (Belgium) High Polymers

Section lectures—

1. Kinetics and Mechanism of Polyreactions  
O. F. OLAJ (Austria) Main Features of the Kinetics of Polyreactions  
J. P. KENNEDY (USA) Carbenium Ion Polyreactions
2. Structure and Properties of High Polymers  
E. BAER (USA) Structure and Properties of Polymeric Solids under High Pressure  
R. KOSFELD (Germany) Conformation and (Internal) Flexibility of Macromolecules
3. Thermodynamics of High Polymers  
TH. G. SCHOLTE (Netherlands) Determination of Thermodynamic Quantities of Solutions of High Polymers with the Help of Light Scattering and Equilibrium Ultracentrifugation
4. New Developments  
G. DALL'ASTA (Italy) Synthesis and Transformation of Polymers through Metathesis and Structure of Catalysts for Metathesis  
N. G. GAYLORD (USA) Polymerization of Polymer-induced Comonomer Charge Transfer Complexes
5. Inorganic High Polymers  
W. NOLL (Germany) Inorganic High Polymers

### *Section 2 Chemistry of Organic Natural Products*

Plenary lecture—

F. SANGER (UK) Sequences in Nucleic Acids

Section lectures—

1. Chemistry of Nucleic Acids and Nucleotides  
H. G. KHORANA (USA) Synthesis of DNA  
CH. WEISSMANN (Switzerland) Structure and Function of a Viral RNA

2. Antibiotics and Mycotoxins
 

YU. A. OVCHINNIKOV (USSR)	Macrocyclic Depsipeptide Antibiotics and Transmembrane Ion Transport
G. BÜCHI (USA)	Chemistry of Some Mycotoxins
S. SHIBATA (Japan)	Anthraquinonoid Mycotoxins
3. Chemistry of Lipids and Prostaglandins
 

L. L. M. VAN DEENEN (Netherlands)	Phospholipids
D. SHAPIRO (Israel)	Approaches to the Synthesis of Gangliosides
4. Problems of Nitrogen Fixation
 

E. E. VAN TAMELEN (USA)	An Organic-inorganic System for Chemical Modification of Molecular Nitrogen under Mild Conditions
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### *Section 3 Solid-state Chemistry*

#### Plenary lecture—

- |                    |  |
|--------------------|--|
| N. B. HANNAY (USA) | Recent Advances in Solid-state Chemistry |
|--------------------|--|

#### Section lectures—

1. Elementary Processes of Material Transport involving Inorganic Solids
 

A. B. LIDIARD (UK)	Atomic and Ionic Transport in Crystalline Solids
--------------------	--
2. Principles of Preparative Solid-state Chemistry
 

J. C. JOUBERT (France)	Hydrothermal Synthesis of New Dense Phases of Transition Metal Oxides and Hydroxides under Very High Pressure (100 Kbar) and High Temperature (1500°C) Conditions
R. F. BREBRICK (USA)	Thermodynamics and Preparation of Non-stoichiometric Nonmetallic Compounds
3. Principles of Inorganic Structural Chemistry
 

ST. ANDERSSON (Sweden)	Aspects of the Principles of Structure and Synthesis of Oxide or Oxide-like Compounds Formed by Transition Elements of Groups IV, V, and VI of the Periodic Table
A. KJEKSHUS (Norway)	Current Problems Concerning Structural Chemistry of Transition Metal Pnictides and Chalcogenides
E. PARTHÉ (Switzerland)	Application of Valence Electron Concentration in Crystal Chemistry
J. PORTIER (France)	Crystal Chemistry and Magnetic Properties of Fluorides and Oxyfluorides of 3d Transition Elements

### *Section 4 Compounds of Nonmetals*

#### Plenary lecture—

- |                    |  |
|--------------------|--|
| R. SCHAEFFER (USA) | Recent Advances in Structural Chemistry of Nonmetals |
|--------------------|--|

#### Section lectures—

1. Boron Chemistry
 

H. NÖTH (Germany)	New Results and Aspects of Boron Chemistry
P. L. TIMMS (UK)	Developments in Boron and Silicon Subhalide Chemistry



2. Silicon Chemistry  
R. A. BENKESER (USA) Chemical Properties of the Si-H Bond
3. Phosphorus Chemistry  
F. H. WESTHEIMER (USA) Mechanisms of Hydrolysis of Phosphates and Related Compounds  
R. F. HUDSON (UK) Reactivity of Heterocyclic Phosphorus Compounds
4. Compounds of Sulfur  
O. FOSS (Norway) Aspects of the Structural Chemistry of Polythionates  
F. G. BORDWELL (USA) Sulfur Groupings as Mechanistic Probes
5. Compounds of Halogens  
K. O. CHRISTIE (USA) Halogen Fluorides  
R. J. GILLESPIE (Canada) Halogen Cations

### *Section 5 Applied Electrochemistry*

Plenary lecture—

- M. FLEISCHMANN (UK) Some Engineering Aspects of Electrosynthesis

Section lectures—

1. Electrochemical Processes and Reaction Techniques  
F. GOODRIDGE (UK) Recent Developments in Design of Electrolytic Cells  
N. IBL (Switzerland) Fundamentals of Electrochemical Engineering: Role of Transport Phenomena
2. Electrochemical Energy Conversion  
W. VIELSTICH (Germany) Electrochemical Energy Conversion with the Help of Fuel Cells and Metal-Air Cells  
F. VON STURM (Germany) Electrocatalysis in Power-generating Cells
3. Organic and Inorganic Electrochemistry  
F. BECK (Germany) Organic Electrosynthesis in the Capillary Gap Cell  
L. EBERSON (Sweden) Organic Synthesis by Anodic Oxidation: Uses and Limitations  
G. CAUQUIS (France) Why Organic Solvents are so Interesting in Organic and Inorganic Electrochemistry  
L. GIERST (Belgium) Electrochemical Oxygen Ionization: Catalysis and Inhibition
4. Electrochemical Surface Treatment  
Y. M. KOLOTYRKIN (USSR) Electrochemical Surface Treatment

### *Section 6 Radiochemistry*

Plenary lecture—

- G. T. SEABORG (USA) Status Report on the Transuranic Elements

Section lectures—

1. Chemical Technology of Nuclear Fuels  
D. E. FERGUSON (USA) Chemical Reprocessing of Nuclear Fuels  
W. STOLL (Germany) Preparation of Fuel Elements

2. Transuranic Elements
 

A. GHIORSO (USA)	Studies on the Heaviest Elements at Berkeley
I. ZVARA (USSR)	Studies on the Heaviest Elements at Dubna
V. I. SPITZEN (USSR)	Chemical Research on the Actinide Elements
3. Preparation of Radionuclides and Labelled Compounds
 

A. P. WOLF (USA)	Labelling of Compounds with Short Lived Nuclides and their Application
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4. Nuclear Methods in Technology and the Environment
 

K. LJUNGGREN (Sweden)	Nuclear Applications to Technology
G. B. COOK (Austria)	Nuclear Applications to Environmental Problems

*Section 7 Symposium on Information and Communication in Chemistry*

Circulars containing forms for submitting discussion papers on the above themes are available from:

Dr. W. FRITSCHÉ  
c/o Gesellschaft Deutscher Chemiker  
Postfach 119075  
D-6000 Frankfurt/Main 8  
Germany

In addition to the above general scientific programme of the Congress, the following joint symposia will be held:

1. *Polypeptide Hormones and Releasing Factors*  
by the Medicinal Chemistry Section of the Organic Chemistry Division of IUPAC
2. *Modern Methods for Treatment of Waste Water in Theory and Practice*  
by the Water Quality Section of the Applied Chemistry Division of IUPAC

There will also be an exhibition on *Safety in Chemistry* organized by Berufsgenossenschaft der Chemischen Industrie.

# INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

## CONFERENCE ON EDUCATION OF TEACHERS FOR INTEGRATED SCIENCE

University of Maryland / USA, 3-13 April 1973

The Conference is being organized on the initiative of the ICSU Committee on Teaching of Science with the theme *Teaching Science for Today's Society*.

### Scope and Purpose

The major concern of the Conference will be the education of teachers—both initial and inservice—to teach science in both *integrated* and *co-ordinated* ways.

It is obviously necessary, in order to avoid ambiguity, to distinguish clearly between:

- (i) Complete integration, which consists of joining several subjects into a single course in which the concepts of science are presented through a unified approach;
- (ii) Coordination, which entails a carefully planned collaboration between the various disciplines and in the training of teachers for such an approach.

The Conference will follow up the work of the Varna Conference in 1968 where the central question was “Why integrate science teaching?” Discussion of the aims, objectives, and methods of integrated science teaching will continue. Special consideration will be given to the relevance of integrated science to the development of social responsibility.

New approaches to the university and college education of teachers of science for all levels of education will be explored in relation to their effectiveness in achieving appropriate integration or coordination in a given situation. Suitable curriculum materials for the education of science teachers will be of particular concern, notably the contributions of laboratory-based study, field studies, multimedia methods, and group and individual learning approaches.

The role of Science Teachers' Associations, Teachers' Centres, Inspectors and Advisers will be considered along with the contribution colleges and universities need to make to the lifelong education of the science teacher.

Plenary sessions, lectures, visits, demonstrations, working sessions, and practice with materials will contribute to a Conference in which there will be a high degree of participation by all. The Conference is intended to lead to a set of guidelines or summary statements that will be of help to all those concerned with the education of science teachers.

The Conference has been commended by UNESCO.

### Participation

To fulfil its intention to be a working meeting, there will be a limit of about 200 participants. Since it is also to be as international in representation as possible, this means that the number of persons from any individual country will be limited. The principal working languages will be English and French.

It is expected that a wide range of persons will be vitally interested in this



Conference, including policy makers in science education and teacher education, curriculum innovators, and developers of materials for integrated science, science teachers, teacher educators. Ministries of Education, National Science Teachers' Associations, key science educators, and the staff of Integrated Science Projects are asked to suggest participants.

### **Location**

The Conference will be held in the Adult Education and Science Teaching Centers of the University of Maryland, College Park, Maryland. The University is close to Washington, DC, and hence is in an area where there are a large number of institutions of interest to science educators. Participants will have a chance to visit some of these and to share in the facilities of the Science Teaching Center which, among other things, is the headquarters of the International Clearing House for Science and Mathematics Curriculum Developments. Residence and meals will be provided in the Adult Education Center.

### **Application Forms**

Those wishing to obtain further information or application forms should write to:

Miss M. DIETZ  
Science Teaching Center  
University of Maryland  
College Park  
Maryland 20742, USA

## **ACTIVITIES OF OTHER INTERNATIONAL UNIONS**

### **IX INTERNATIONAL CONGRESS OF BIOCHEMISTRY**

**Stockholm, 1-7 July 1973**

The Congress is sponsored by the International Union of Biochemistry and the arrangements are being made by the Swedish National Committee on Biochemistry of the Royal Academy of Sciences. It will be held at the recently inaugurated Stockholm International Fairs and Activity Centre, located at Älvsjö, southwest of central Stockholm.

### **Scientific Programme**

Two plenary lectures will be presented at the opening session and two at the closing session of the Congress. The following distinguished scientists have accepted invitations to deliver these lectures:

B. S. HARTLEY (UK)  
G. E. PALADE (USA)  
E. C. SLATER (Netherlands)  
S. SPIEGELMAN (USA)

Section programmes will cover the following fields:

1. Separation Methods for Macromolecules
2. Structure and Function of Proteins
3. Biosynthesis of Nucleic Acids and Proteins
4. Bioenergetics
5. Membrane Biochemistry
6. Immunochemistry
7. Metabolic Function of Oxygenases
8. Regulation of Intermediary Metabolism
9. Biochemistry of Lipids

Each section programme will include (1) a symposium, consisting of about 20 lectures of approximately 30 minutes by invited speakers, and (2) a number of short, submitted communications, presented either orally or in poster sessions. There will be opportunities for discussing each presentation.

Colloquia will be arranged on the following topics:

- A. Biochemistry of the Extracellular Matrix
- B. Molecular Evolution
- C. Biochemistry of Synaptic Transmission
- D. Polypeptides with Hormonal, Toxic or Antibiotic Properties

Each colloquium will consist of 5 lectures of about 30 minutes by invited speakers and a panel discussion. The panel discussion will include a number of brief, submitted discussion comments.

Abstracts of all accepted contributions—communications as well as discussion comments—will be printed in an Abstract Book, together with summaries of the symposium and colloquium lectures. All Congress publications will be in English. Lectures and communications may be presented in any language, but the organizers hope that the speakers will use a language commonly understood by the participants, preferably English. No arrangements will be made for simultaneous translation.

### **Correspondence**

All correspondence concerning the Congress should be sent to:

Secretariat  
IX International Congress of Biochemistry  
c/o Svenska Kemistsamfundet  
Wenner-Gren Center, 6 tr  
S-113 46 Stockholm, Sweden

Telephone: 08/347208 and 08/347268  
Telegrams: BIOCHEMISTRY, Stockholm

### **ERRATUM**

To those Associate Members present at the 1971 meeting of the IUPAC Section on Oils and Fats in St. Gallen (*Information Bulletin* No. 41, p. 14) should be added Prof. E. L. DELVAUX.

# ASSOCIATED ORGANIZATIONS OF IUPAC

## EUROANALYSIS—I

Heidelberg, 28 August-1 September 1972

The 1st European Analytical Conference is being organized under the sponsorship of the Federation of European Chemical Societies, by die Fachgruppe Analytische Chemie der Gesellschaft Deutscher Chemiker, Sectie voor Analytische Chemie van de Koninklijke Nederlandse Chemische Vereniging, and the Society for Analytical Chemistry.

The subject matter will cover all aspects of analytical chemistry. It is proposed to arrange lectures in streams as follows:

1. Electron-Spectroscopy and Photoionization
2. High Polymer Analysis
3. Pollution Analysis
4. Separation and Preconcentration
5. Electroanalysis
6. Spectroscopy
7. Other Aspects of Analytical Chemistry
8. Analytical Chemistry as a Subject of Instruction in Universities

In addition to plenary lectures, discussion papers will also be included in the programme.

Plenary lecturers who have accepted an invitation to speak are:

W. BRÜGEL (Ludwigshafen)	Analytische Anwendungen der Röntgen-Photo-Elektronen-Spektroskopie
H. J. CANTOW (Freiburg)	Molekulargewicht und Aufbau von Polymeren
L. A. CLARENBURG (Schiedam)	Air Pollution Measurement as a Tool for Practical Policy and Control Strategy
H. IRVING (Leeds)	Separation and Preconcentration
L. MEITES (New York)	Some Applications of Multiparametric Curve Fitting and Pattern Recognition to Electro-analytical Problems
H. A. WILLIS (Hertfordshire)	New Applications of Spectroscopy
R. BELCHER (Birmingham)	Analytical Chemistry Now and in the Future
H. A. LAITINEN (Urbana/ Illinois)	Trends in Teaching of Analytical Chemistry in American Universities

### Correspondence

Further details may be obtained from:

Gesellschaft Deutscher Chemiker  
Geschäftsstelle  
Postfach 119075  
D-6000 Frankfurt/Main 8  
Germany



## **NEW IUPAC PUBLICATIONS FROM BUTTERWORTHS**

### **SELECTED CONSTANTS: OXIDATION-REDUCTION POTENTIALS OF INORGANIC SUBSTANCES IN AQUEOUS SOLUTION**

**By G. Charlot, A. Collumeau, and J. C. Marchon**

The aim of these tables is essentially to supply the chemist with a convenient working tool which will enable him to find rapidly the best or most probable value of the normal or formal oxidation-reduction potential of a given redox system.

This work has been prepared under the auspices of the Commission on Electroanalytical Chemistry of the Analytical Chemistry Division of the Union. It represents an updating of the material published in 1958 as Vol. 8 of Tables of Constants and Numerical Data by Pergamon Press.

73 pages

\$10.50 or £3.50

### **DISSOCIATION CONSTANTS OF ORGANIC BASES IN AQUEOUS SOLUTION**

The original table, published in 1965, covered the literature up to the end of 1961 and summarized data on some 3,800 compounds. The present supplement extends the coverage to the end of 1970: it has also been prepared by Dr. D. D. PERRIN. The index, which lists upwards of 7,000 compounds, is a combined one covering the original table and the supplement.

Available later in 1972

### **STANDARD METHODS FOR ANALYSIS OF OILS, FATS, AND SOAPS**

The following methods have recently been adopted and edited for publication by the Section on Oils and Fats:

- |         |  |
|---------|--|
| II.D.7  | Iodine Value   |
| II.D.17 | Determination of Di- and Tri-Unsaturated Fatty Acids by UV Spectrophotometry |
| II.D.20 | Determination of Epoxy-group Oxygen  |
| III.A.2 | Determination of Arsenic in Glycerol   |
| IV.A.11 | Determination of the Unsaponified and Unsaponifiable Matter in Soaps         |
| IV.A.12 | Determination of Minor Quantities of Glycerol in Soaps                       |

These methods are additional to those included in the 5th Edition (1964) and its Supplement (1966).

Available later in 1972

## FOUR IMPORTANT NEW PUBLICATIONS AVAILABLE FROM IUPAC SECRETARIAT

### Definitive Rules for Nomenclature of Steroids

This work originates from a discussion held at the CIBA Foundation in London in 1950 between representatives of many schools. The proposals were subsequently taken over by IUPAC and amendments and additions made over a number of years. Tentative Rules were formulated by the IUPAC-IUB Commission on Biochemical Nomenclature and published in the *Information Bulletin* [No. 33 (1968)]. These Rules have been studied further by the Commission and a definitive version produced.

The areas of steroid chemistry covered are: Fundamental Carbocycles, Pentacyclic and Hexacyclic Modifications, Derivatives, Stereochemical Modifications, Shortening of Sidechains and Elimination of Methyl Groups, Ring Contraction or Expansion, Ring Fission, Modification by Bond Migration (*abeo* System), Heterocyclic Modifications, Steroid Alcohols. An appendix gives Guidelines for Steroids containing Additional Rings.

Many of the principles in these Rules have become universally accepted in diterpene and triterpene chemistry; also to some extent for sesquiterpenes and for several groups of alkaloid.

Published in *Pure and Applied Chemistry* (Vol. 31, Nos. 1-2, 1972) and available as a reprint (ii+38 pages) from the IUPAC Secretariat, price US \$1.50 (£0.50)—cash with order, postage free.

### UNESCO Survey of Chemistry Teaching at the University Level

This survey (212 pp.) has been prepared by IUPAC at the invitation of UNESCO with the aim of providing a comparative assessment of university-level courses designed to educate chemists in different regions of the world. Contributors from 22 countries were invited to provide short reports, surveying the situation under three headings—general information, main problems, and new trends. The actual survey was prepared on the basis of these reports; the individual reports are attached as an appendices.

The survey is intended to be illustrative rather than definitive; in the present state of university chemistry teaching, where so many changes are being considered but so few have actually occurred, a nondefinitive survey is unavoidable. This presentation of the overall situation will nevertheless be of assistance to all those responsible for teaching chemistry at university level.

Available from IUPAC Secretariat, price US \$3.00 (£1.00)—cash with order, postage free.

### Definitions, Terminology, and Symbols in Colloid and Surface Chemistry—I

This Appendix to the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* [Butterworths, 1970 and *Pure and Applied Chemistry* **21** (1), (1970)], has been prepared by the Commission on Colloid and Surface Chemistry of the Division of Physical Chemistry of IUPAC. It is the outcome of extensive discussions within the Commission, with other IUPAC Commissions, and with persons and organizations outside IUPAC, over the period 1961–1971. A tentative version of these proposals was issued by IUPAC as *Tentative Nomenclature Appendix* No. 3 (January 1970) to the *Information*

*Bulletin*: the text has been revised in the light of the criticisms, comments, and suggestions which were received.

The Appendix consists of three Sections: the first is concerned with definitions and terminology, and with recommendations for appropriate symbols; the second is a list of recommended symbols; and the third an alphabetical index of terms defined, together with the corresponding symbols. The areas dealt with are: Adsorption and Spread Monolayers; Mechanical and Thermodynamic Properties of Surfaces and Interfaces; Definition and Classification of Colloids; Preparation and Processing of Colloidal Systems; Stability of Colloidal Systems, Aggregation, Coagulation, Flocculation; Surface Active Agents; Fluid Films; Colligative and Related Properties; Attraction and Repulsion; Sedimentation, Creaming, Centrifugation, and Diffusion; Electrochemical Terms in Colloid and Surface Chemistry; Electrokinetics.

Published in *Pure and Applied Chemistry* (Vol. 31, No. 4, 1972) and available as a reprint (v+56 pages) from the IUPAC Secretariat, price US \$2.25 (£0.75)—cash with order, postage free.

## **Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis—I**

### **General Atomic Emission Spectroscopy**

The purpose of this document is to propose a consistent nomenclature for workers in spectrochemical analysis. Many of the terms have already been defined in several nomenclature documents, especially those developed by IUPAC, IUPAP, and ASTM. The fact that many of the symbols, units, nomenclature, and definitions previously recommended are repeated in this document demonstrates that the nomenclature of a specific field, *i.e.*, spectrochemical analysis, is deeply rooted in the general nomenclature of chemistry and physics. However, the adaptation of a general system to a specialized field required a careful selection of general terms and the addition of new ones. The tentative version of Part I was published as *Tentative Nomenclature Appendix No. 1* (December 1969) to the *Information Bulletin*. After careful revision the Commission on Spectrochemical and Other Optical Procedures for Analysis of the Analytical Chemistry Division of IUPAC has now produced a definitive version.

Included in Part I are the following: General Recommendations and Practices; Terms and Symbols for Physical Quantities in General Use; Terms, Symbols, and Units Related to Radiant Energy; Terms and Symbols for Description of Spectrographic Instruments; Terms and Symbols Related to Analytical Procedures; Terms and Symbols Related to Fundamental Processes Occurring in Light (Excitation) Sources; Photographic Intensity Measurements (Photographic Photometry). A statement by ASTM on General Principles of Nomenclature Standardization is reprinted as an Appendix. A second Appendix deals with Application of the Concept of Optical Conductance.

Published in *Pure and Applied Chemistry* (Vol. 30, Nos. 3-4, 1972) and available as a reprint (29 pages) from the IUPAC Secretariat, price US \$1.20 (£0.40)—cash with order, postage free.



## APPENDICES TO IUPAC INFORMATION BULLETIN

The following Appendices have been issued in 1972:

### *Appendices on Tentative Nomenclature, Symbols, Units, and Standards February 1972*

- No. 14 Recommendations on Nomenclature for Contamination Phenomena in Precipitation from Aqueous Solutions (Commission on Analytical Nomenclature)
- No. 15 Recommendations on Nomenclature for Chromatography (Commission on Analytical Nomenclature)
- No. 16 Recommendations for Nomenclature of Thermal Analysis (Commission on Analytical Nomenclature)
- No. 17 Recommendations for Nomenclature of Mass Spectrometry (Commission on Analytical Nomenclature)
- No. 18 Recommendations on Nomenclature of Scales of Working in Analysis (Commission on Analytical Nomenclature)
- No. 19 Rules for Nomenclature of Carotenoids (IUPAC Commission on Organic Nomenclature and IUPAC-IUB Commission on Biochemical Nomenclature)
- No. 20 Quantities and Units in Clinical Chemistry (Clinical Chemistry Section and International Federation of Clinical Chemistry)
- No. 21 List of Quantities in Clinical Chemistry (Clinical Chemistry Section and International Federation of Clinical Chemistry)

### *June 1972*

- No. 22 Nomenclature of Multiple Forms of Enzymes (IUPAC-IUB Commission on Biochemical Nomenclature)
- No. 23 Symbols for Amino Acid Derivatives and Peptides (IUPAC-IUB Commission on Biochemical Nomenclature)
- No. 24 Recommended Names and Symbols for Light and Related Electromagnetic Radiation (Commission on Physicochemical Symbols, Terminology, and Units)
- No. 25 Recommendations on Nomenclature for Nuclear Chemistry (Commission on Analytical Radiochemistry and Nuclear Materials)

### *Technical Reports*

#### *February 1972*

- No. 4 Recommended Method for Benzo(a)pyrene in Foods (Commission on Trace Substances)
- No. 5 A Survey of Analytical Procedures for Traces of *N*-Nitrosamines in Foods (Commission on Trace Substances)

Subscribers to the *Information Bulletin* receive all Appendices automatically and free-of-charge on publication. Gratis copies may also be obtained by writing to:

The Assistant Secretary (Publications)  
IUPAC Secretariat  
Bank Court Chambers  
2-3 Pound Way  
Cowley Centre  
Oxford OX4 3YF, UK

## PROCEEDINGS OF 1971 MEETING OF ICSU ABSTRACTING BOARD

The 1971 General Assembly and Full Board meetings of the ICSU AB were held in Orléans, France, during July, at the kind invitation of Bureau de Recherches Géologiques et Minières. The proceedings (219 pp.) are now available and comprise:

- The first part, a detailed description of the activities of the Board.
- The second part records the most recent developments in the activities of the ICSU AB Members, in particular Member Services (the largest Abstracting and Indexing Services all over the world) and Member Unions, in all aspects of scientific and technical information.
- The third part comprises reports from the most important international organization active in scientific and technical information.
- The fourth part records a special session with representatives of primary publications devoted to the development of closer cooperation between primary and secondary publications.
- The fifth part is an outline of another special session which was devoted to an interchange of views about marketing of secondary information services.

This publication represents an up-to-date overview of the most recent developments in scientific and technical information world wide. Copies may be purchased (US \$15.00 plus mailing charges) from:

ICSU AB Secretariat  
17 rue Mirabeau  
F-75 Paris 16<sup>e</sup>, France

### Other ICSU AB Publications

#### *Serials*

- List of Publications of ICSU Scientific Unions, Special and Scientific Committees and Commissions of ICSU (Annual—price US \$5.00 plus mailing charges)
- Survey of Activities of ICSU Scientific Unions, Special and Scientific Committees and Commissions of ICSU in the Field of Scientific Information (Annual—price US \$12.00 plus mailing charges)

#### *Reports*

- Some Characteristics of Primary Periodicals in the Domain of the Physical Sciences (June 1966—68 pp.—price US \$5.00 plus mailing charges)
- Some Characteristics of Primary Periodicals in the Domain of the Chemical Sciences (June 1967—92 pp.—price US \$5.00 plus mailing charges)
- Some Characteristics of Primary Periodicals in the Domain of the Biological Sciences (April 1968—84 pp.—price US \$5.00 plus mailing charges)
- World Literature in Physics as seen through *Bulletin Signalétique*—1964 issues (January 1967—326 pp.—price US \$15.00 plus mailing charges)
- World Literature in Physics as seen through *Physics Abstracts*—1964 issues (July 1967—531 pp.—price US \$15.00 plus mailing charges)
- World Literature in Physics as seen through *Physikalische Berichte*—1964 issues (March 1968—505 pp.—price US \$15.00 plus mailing charges)

- Compared Activities of the Main Abstracting and Indexing Services covering Physics, Chemistry, and Biology during the year 1965 (December 1967—83 pp.—price US \$5.00 plus mailing charges)
- Proceedings of ICSU AB Full Board Meeting, July 1970, Columbus (Ohio) USA (December 1970—265 pp.—price US \$15.00 plus mailing charges)
- International List of Periodical Title Word Abbreviations (1970—39 pp.—price US \$4.50 plus mailing charges)

## SPECIAL PUBLICATION

### BIBLIOGRAPHY ON THE HIGH TEMPERATURE CHEMISTRY AND PHYSICS OF MATERIALS

The Commission on High Temperatures and Refractories of the Inorganic Chemistry Division of IUPAC has sponsored this quarterly publication since 1956. About 200 journals are scanned by contributors in 14 countries for research papers published in the following fields:-

#### *Part 1. Solids and Liquids*

Devices for achieving, measuring, and controlling temperatures above 1500°C; devices for physical measurements above 1000°C; thermodynamic properties below 1000°C of materials with a melting point above 1500°C; properties of all materials above 1000°C; phase equilibria above 700°C; reactions above 700°C; books.

#### *Part 2. Gases*

Each bibliography is normally published less than 2 months after compilation, which makes it one of the quickest retrieval systems available.

The cost is that of printing and mailing only, because the compilers give their services free; typing and circulation secretarial work is provided by courtesy of the Nuffield Research Group in Extraction Metallurgy at Imperial College, London.

The average number of papers is 700 in Part 1 and 250 in Part 2 and the annual subscription (4 issues) is \$3.90 (£1.50)\* which includes surface mailing to all destinations.

Because there is no sales staff it would be greatly appreciated if orders could be prepaid to 'IUPAC High Temperature Bibliography'. Orders should be addressed to:

Dr. M. G. HOCKING (IUPAC)  
Department of Metallurgy  
Imperial College of Science & Technology  
London SW7 2BP, UK

\*The prices were given incorrectly in Bulletin No. 41, p. 62.



# CALENDAR OF IUPAC-SPONSORED MEETINGS

1972

July 2-7	International Symposium on Macromolecules (Dr. J. LARINKARI, Federation of Finnish Chemical Industry, POB 28, SF-00131 Helsinki 13, Finland)	Helsinki (Finland)
July 3-8	International Symposium on Chemistry in Evolution and Systematics (Dr. J. B. HARBORNE, Secretary of Organizing Committee, International Symposium on Chemistry in Evolution and Systematics, c/o Phytochemical Unit, Department of Botany, University of Reading, London Road, Reading RG1 5AQ, UK)	Strasbourg (France)
July 16-22	IVth IUPAC International Photochemistry Symposium (Prof. H. E. ZIMMERMAN, Department of Chemistry, University of Wisconsin, 1101 University Avenue, Madison, Wisconsin 53706, USA)	Baden-Baden (Germany)
July 17-21	VIIth International Symposium on Reactivity of Solids (Dr. R. M. DELL, Executive Secretary, VIIth ISRS, c/o Building 220, Atomic Energy Research Establishment, Harwell, Didcot, Berkshire, UK)	Bristol (UK)
August 14-18	VIth International Symposium on Carbohydrate Chemistry (Prof. L. ANDERSON, Secretary of Organizing Committee, VIth International Symposium on Carbohydrate Chemistry, Department of Biochemistry, University of Wisconsin, Madison, Wisconsin 53706, USA)	Madison Wisconsin (USA)
August 21-22	International Symposium on Control of Mycotoxins (Mycotoxin Symposium Secretariat, c/o Svenska Institutet för Konserveringsforskning, Kallebäck, Fack, S-400 21 Göteborg 16, Sweden)	Kungälv Göteborg (Sweden)
August 21-24	IIInd Discussion Conference: Macromolecular Matrices and Carriers of Biological Functions (Conference Secretariat, c/o Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Petřiny 1888, Praha 616, Czechoslovakia)	Prague (Czechoslovakia)
August 21-25	Vth International Congress on Catalysis (Dr. V. HAENSEL, Chairman of Organizing Committee, Vth International Congress on Catalysis, c/o Universal Oil Products Co., 30 Algonquin Road, Des Plaines, Illinois 60016, USA)	Miami Beach Florida (USA)
August 28-31	Xth Prague Microsymposium on Macromolecules: Conformational Structure of Polymers (Microsymposium Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Petřiny 1888, Praha 616, Czechoslovakia)	Prague (Czechoslovakia)
August 28- September 1	Ist International Symposium on Advances in Microbial Engineering (Dr. Z. ŠTĚRBÁČEK, Secretary of Organizing Committee, Symposium on Advances in Microbial Engineering, c/o Institute of Microbiology, Czechoslovak Academy of Sciences, Budějovická 1083, Praha 4-Krč, Czechoslovakia)	Marienbad (Czechoslovakia)
September 4-7	IIIrd National Conference of Pure and Applied Physical Chemistry (Conferinta de Chimie Fizică, CP 2103, Bucharest 13, Romania)	Bucharest (Romania)
September 4-7	XIth Prague Microsymposium on Macromolecules: Mechanism of Inhibition Processes in Polymers (Microsymposium Secretariat, Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Petřiny 1888, Praha 616, Czechoslovakia)	Prague (Czechoslovakia)

September 4-7	IIIrd International Symposium on Carotenoids other than Vitamin A (Prof. C. BODEA, Chairman of Organizing Committee, IIIrd International Symposium on Carotenoids, Ministerul Invajamintului, Institutul Agronomic "Dr. Petru Groza", Strada Mănăştur 3, Cluj, Romania)	Cluj (Romania)
September 4-8	Ist IUPAC Conference on Physical Organic Chemistry (Prof. H. ZOLLINGER, Technisch-Chemisches Laboratorium der Eidgenössische Technische Hochschule, Universitätstrasse 6, CH-8006 Zürich, Switzerland)	Crans-sur-Sierre (Switzerland)
September 11-15	VIth International Congress on Surface Active Substances (General-Sekretariat des VI. Kongresses, Schweizerische Gesellschaft für Chemische Industrie, Nordstrasse 15, CH-8035 Zürich, Switzerland)	Zürich (Switzerland)
September 13-15	IIIrd International Symposium on Medicinal Chemistry (Dr. E. SALA, Società Italiana Scienze Farmaceutiche, Via Giorgio Jan 18, I-20129 Milano, Italy)	Milan (Italy)

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April 9-12	International Symposium on Selective Ion-sensitive Electrodes (Mr. D. R. HUB, Secretary of International Symposium on Selective Ion-sensitive Electrodes, University of Wales Institute of Science and Technology, King Edward VII Avenue, Cardiff CF1 3NU, UK)	Cardiff (UK)
July 4-6	IVth Canadian Wood Chemistry Symposium (Dr. D. W. CLAYTON, General Chairman, IVth Canadian Wood Chemistry Symposium, c/o Pulp and Paper Research Institute of Canada, 570 St. John's Boulevard, Pointe Claire 720, Quebec, Canada)	Quebec (Canada)
August 23- September 1	XXVIIth International Conference on Pure and Applied Chemistry (Executive Secretary, IUPAC Secretariat, 2/3 Pound Way, Cowley Centre, Oxford OX4 3YF, UK)	Hamburg or Munich (Germany)
August 29-31	IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies (Dr. A. J. COLLINGS, Environmental Safety Division, Unilever Research Laboratory, Colworth House, Sharnbrook, Bedfordshire, UK)	Hamburg (Germany)
September 3-8	XXIVth International Congress on Pure and Applied Chemistry (Dr. W. FRITSCHÉ, Gesellschaft Deutscher Chemiker, Carl-Bosch-Haus, Varrentrappstrasse 40-42, Postfach 119075, D-6000 Frankfurt/Main 8, Germany)	Hamburg (Germany)
September 3-6	IIIrd International Conference on Chemical Thermodynamics (Prof. F. KOHLER, Institut für Physikalische Chemie der Universität Wien, Währingerstrasse 42, A-1090 Wien, Austria)	Baden Vienna (Austria)
September 10-14	International Symposium on Macromolecules (Dr. J. F. GIBSON, International Symposium on Macromolecules, c/o The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Aberdeen (UK)

#### 1974

March	IVth International Conference on Crystal Growth (Prof. R. R. HASIGUTI, Chairman of National Organizing Committee, ICCG-IV, c/o Department of Metallurgy and Materials Science, Faculty of Engineering, University of Tokyo, Bunkyo-ku, Tokyo, Japan)	Tokyo (Japan)
August 19-24	XVIth International Conference on Coordination Chemistry (Dr. W. J. DAVIS, Secretary of Organizing Committee, XVI-ICCC, c/o Department of Chemistry, Trinity College, University of Dublin, Dublin 2, Ireland)	Dublin (Ireland)

September	International Symposium on Macromolecules (Dr. S. GONZALEZ-BABÉ, Secretary of International Symposium on Macromolecules, Instituto de Plásticos y Caucho, c/o Juan de la Cierva No. 3, Madrid 6, Spain)	Madrid (Spain)
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## CALENDAR OF NON-IUPAC MEETINGS

1972

July 3-7	IIInd International Symposium on Nuclear Magnetic Resonance Spectroscopy (Dr. J. F. GIBSON, The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Guildford (UK)
July 24-27	International Symposium on Organic Chemistry of the Excited State (Dr. J. F. GIBSON, The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Reading (UK)
August 7-14	IVth International Biophysics Congress (Prof. L. P. KAYUSHIN, Organizing Committee for IVth Biophysics Congress, Profsoyuznaya 7, Moscow V-133, USSR)	Moscow (USSR)
August 14-18	International Symposium on Physics and Chemistry of Ice (Mr. M. K. WARD, National Research Council of Canada, Ottawa 7, Ontario, Canada)	Ottawa (Canada)
August 20-25	International Symposium on Organic Synthesis (Dr. J. P. KUTNEY, Department of Chemistry, University of British Columbia, Vancouver 8, British Columbia, Canada)	Vancouver (Canada)
August 26 -September 7	IXth General Assembly and International Congress of Crystallography (General Secretary, Organizing Committee, Science Council of Japan, 22-34 Roppongi 7-chome, Minato-ku, Tokyo 106, Japan)	Kyoto (Japan)
August 27- September 2	XXIIIrd Meeting of International Society of Electrochemistry (Prof. G. WRANGLÉN, Royal Institute of Technology, S-100 44 Stockholm 70, Sweden)	Stockholm (Sweden)
August 28-31	International Conference on Applications of the Mössbauer Effect (Mr. M. PASTERNAK, Soreq Nuclear Research Center, Yavne, Israel)	Yavne (Israel)
August 28 -September 1	IVth European Symposium on Fluorine Chemistry (Dr. B. FRLEC, Institut 'Jožef Stefan', POB 199, Yu-61001 Ljubljana, Yugoslavia)	Ljubljana (Yugoslavia)
August 28 -September 2	EUCHEM Conference on Antibiotics Biosynthesis and Function (Prof. J. HEDEGAARD, Building 221, Technical University, DK-2800 Lyngby, Denmark)	Aarhus (Denmark)
September 4-7	IXth Symposium on Colouristics (Hungarian Chemical Society, Anker köz 1, Budapest VI, Hungary)	Eger (Hungary)
September 8-13	IIIrd International Conference on Raman Spectroscopy (Mr. L. BERNARD, Laboratoire de Recherches Optiques, Faculté des Sciences, BP 347, F-51 Reims, France)	Reims (France)
September 11-13	Analytical Chemistry Workshop of Analytical Chemistry Division, Chemical Institute of Canada (Dr. M. PLUMMER, Algonquin College, Ottawa, Ontario, Canada)	Ottawa (Canada)



September 11-15	IVth International Congress of Chemical Engineering, Chemical Equipment, Design, and Automation (IVth CHISA Congress, POB 857, Praha 1, Czechoslovakia)	Marienbad (Czechoslovakia)
September 15-19	Symposium on Chemical Engineering (Ministry of Education and Ministry of Chemical Industry, Bucharest, Romania)	Bucharest (Romania)
September	International Colloquium on Semiconducting Polymers (Ministry of Education, Romania Academy, and Ministry of Chemical Industry, Bucharest, Romania)	Jassy (Romania)
September 18-22	IIIrd International Symposium on Chemistry of Organic Solid State (Hon. Secretary, III ISCOSS, Thomas Graham Building, University of Strathclyde, Glasgow C1, UK)	Glasgow (UK)
September 19-22	XXIIIrd Annual Meeting of Société de Chimie physique: Dynamic Aspects of Conformational Changes in Biological Macromolecules (Secrétaire Général, Société de Chimie physique, 10 rue Vauquelin, F-75 Paris 5 <sup>e</sup> , France)	Orléans (France)
September 25-28	Autumn Meeting of The Chemical Society (Dr. J. F. GIBSON, The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Nottingham (UK)
September 27	Reinforced Plastics Symposium: Recent Advances in the Marine Field (Mr. D. H. COHEN, Plastics Institute, 11 Hobart Place, London SW1W 0HL, UK)	Southampton (UK)
October 2-6	International Meetings on Activation Analysis (Mr. J. L. CHEVALIER, Laboratoire Pierre Sue, CEN Saclay, BP 2, F-91 Gif-sur-Yvette, France)	Saclay (France)
October 17-20	Conference on Economic Efficiency and Measuring Methods of Research with Special Regard to Research in the Field of Chemistry (Hungarian Chemical Society, Anker köz 1, Budapest VI, Hungary)	Budapest (Hungary)
November 6	Symposium on Diffusion in Chemical Processes (Canadian Society for Chemical Engineering, Room 906, 151 Slater Street, Ottawa K1P 5H3, Ontario, Canada)	Toronto (Canada)
November 29-30	IInd Plastics Institute National Technical Conference (Mr. D. H. COHEN, Plastics Institute, 11 Hobart Place, London SW1W 0HL, UK)	London (UK)

## IUPAC COLLEAGUES DECEASED

<i>Australia</i>	Prof. W. ROMAN (22 October 1971)—Commission on Teaching of Clinical Chemistry Section
<i>Belgium</i>	Dr. L. DEFFET (29 February 1972)—Sub-Commission on Plasma Chemistry Prof. J. TIMMERMANS (27 August 1971)—Formerly in Commission on Physicochemical Measurements and Standards and Physical Chemistry Division Committee
<i>Italy</i>	Prof. R. PIONTELLI (15 October 1971)—Commission on Electrochemistry
<i>Netherlands</i>	Prof. H. A. BOEKENOOGEN (26 October 1971)—Formerly in Section on Oils and Fats
<i>Sweden</i>	Prof. A. TISELIUS (29 October 1971)—Former President
<i>UK</i>	Prof. Sir RONALD NYHOLM (4 December 1971)—Committee on Teaching of Chemistry

IUPAC International Thermodynamic  
Tables of the Fluid State

**ARGON 1971**

Compiled by S. ANGUS and B. ARMSTRONG  
The Project Centre, Imperial College, London

The Thermodynamic Tables Project was inaugurated by the Commission on Thermodynamics and Thermochemistry of the Division of Physical Chemistry within IUPAC, with the object of compiling internationally agreed values of the equilibrium thermodynamic properties of liquids and gases.

The range covered for each property is that for which reliable experimental data exists. Values are presented as tables upon the basis of which scientists and technologists may produce equations appropriate to their specific requirements.

Future publications will cover agreed values of ethylene, methane, and carbon dioxide.

1972 128 pp.

0 408 70258 3 £5.00 or \$15.00

**CONTENTS:** Introduction  
Symbols and units  
Conversion factors  
The constituent tables  
The IUPAC tables  
References  
Saturation properties  
Table 1: Temperature range 83.780–150.860 K  
Table 2: Pressure range 0.687–48.979 bar  
Single phase properties  
Table 3: Specific volume, specific enthalpy,  
specific entropy, specific isobaric heat capacity  
Temperature range 85–1100 K. Pressure range  
0.1–1000 bar  
Table 4: Pressure, specific internal energy,  
specific entropy, specific isochoric heat capacity  
Temperature range 85–1100 K  
Density range 0.001–1.475 g cm<sup>-3</sup>  
Tolerance diagrams  
Specific volume  
Specific entropy  
Specific enthalpy

*IUPAC publications are available in USA and Canada from Crane,  
Russack & Co., 52 Vanderbilt Avenue, New York, NY 10017*

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Announcing the publication

## COMPTES RENDUS XXVI CONFERENCE

Washington DC: 15-24 July 1971

The biennial Conference of the International Union of Pure and Applied Chemistry (IUPAC) provides the occasion for its council to assemble. Delegations from the 43 member countries make it a truly international gathering.

Council, being responsible for the policy of the Union, receives reports on all major activities undertaken in the name of IUPAC. These reports and the deliberations of Council are recorded in the *COMPTES RENDUS*. In particular, the 'President's Report on the State of the Union' constitutes an excellent summary of progress achieved, at the international level, towards solving those problems of mankind in which the discipline of chemistry figures in a major or minor role.

In addition to Council, several standing committees (on Teaching of Chemistry, Clinical Chemistry, Machine Documentation, *etc.*) and some 30 specialist committees attached to the six IUPAC Divisions (Physical, Inorganic, Organic, Macromolecular, Analytical, and Applied Chemistry) met in Washington. The reports of their meetings cover the many topics of international importance to pure and applied chemistry currently under study for regulation, standardization or codification by the Union.

The *COMPTES RENDUS* concludes with a comprehensive listing of all IUPAC committees, including the names and addresses of the more than six hundred members who belong to them.

This invaluable reference work is available only from the IUPAC Secretariat.

1972      388 pages

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To: IUPAC Secretariat, Bank Court Chambers, 2-3 Pound Way,  
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### COMPTES RENDUS XXVI CONFERENCE

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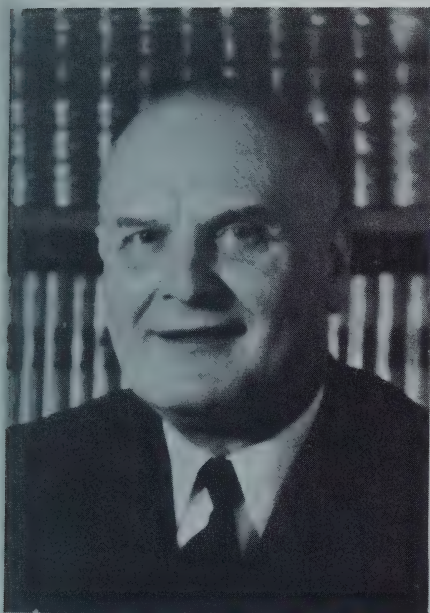
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## IUPAC Secretaries General



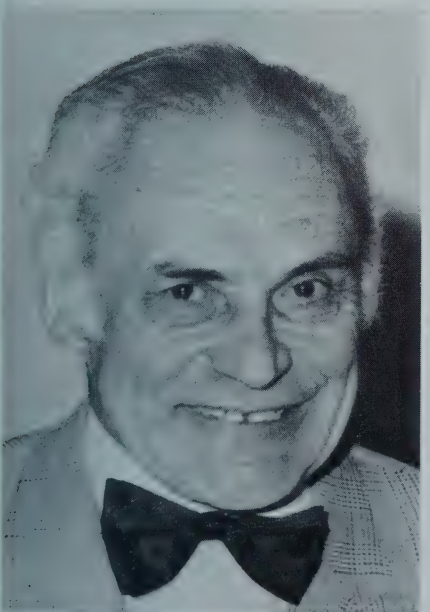
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1920-1940



Prof R Delaby France

1946-1955



Dr R Morf Switzerland

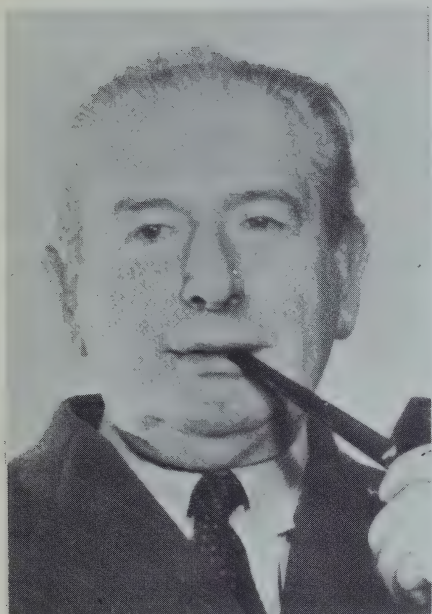
1955-1971



Dr W Gallay Canada

1971-

## IUPAC Treasurers



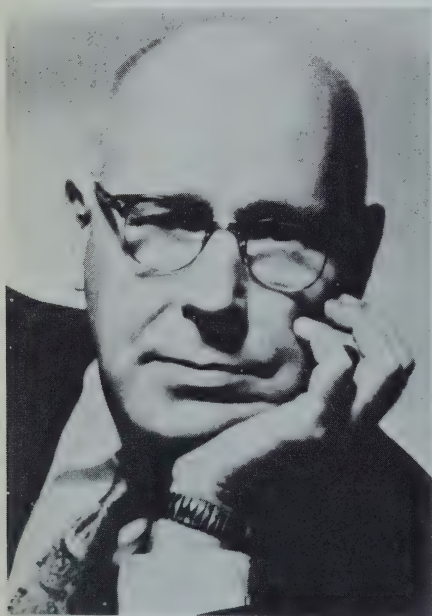
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1947-1957



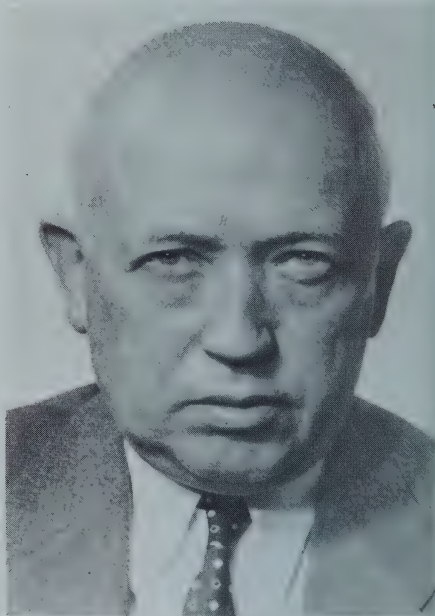
Sir Charles Dodds uk

1957-1963



Prof J C Bailar Jr USA

1963-1971



Prof O Horn Germany

1971-

## LIST OF ABBREVIATIONS

AOAC	Association of Official Analytical Chemists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstracts Service
CBN	IUPAC-IUB Commission on Biochemical Nomenclature
CCPR	Codex Alimentarius Committee on Pesticide Residues
CEBJ	IUB Commission of Editors of Biochemical Journals
CEE	Communauté Européenne Economique
CNOC	IUPAC Commission on Nomenclature of Organic Chemistry
CNRS	Centre National de la Recherche Scientifique (France)
CPPA	Canadian Pulp and Paper Association
FAO	UN Food and Agriculture Organization
FATIPEC	Fédération d'Associations de Techniciens des Industries des Peintures
FSPT	US Federation of Societies for Paint Technology
IAEA	International Atomic Energy Agency
IAMS	International Association of Microbiological Societies
ICCCI	International Coordinating Committee of the Coatings Industry
ICCG	International Congresses on Crystal Growth
ICRO	International Cell Research Organization
ICSU	International Council of Scientific Unions
ISO	International Organization for Standardization
ISO/TC SC	ISO/Technical Committee Sub-Committee
IUB	International Union of Biochemistry
IUBS	International Union of Biological Sciences
IUCr	International Union of Crystallography
IUFoST	International Union of Food Science and Technology
IUPAB	International Union of Pure and Applied Biophysics
IUPAP	International Union of Pure and Applied Physics
JMPR	FAO-WHO Joint Meeting on Pesticide Residues
OCCA	UK Oil and Colour Chemists' Association
OECD	Organization for Economic Cooperation and Development
OCS	IUPAC Organic Coatings Section
SCOPE	ICSU Scientific Committee on Problems of the Environment
SLF	Federation of Scandinavian Paint and Varnish Technicians
UN	United Nations
UNESCO	UN Educational, Scientific, and Cultural Organization
WHO	UN World Health Organization



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**INTERNATIONAL UNION OF PURE  
AND APPLIED CHEMISTRY**

**UNION INTERNATIONALE DE CHIMIE  
PURE ET APPLIQUÉE**

**INFORMATION BULLETIN  
NUMBER 44**

**DECEMBER 1972**

**IUPAC SECRETARIAT**

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International Union of Pure and Applied Chemistry  
1972

# INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

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## IUPAC INFORMATION BULLETIN

The Bulletin provides a news medium for the various activities of IUPAC, especially of its 40 or so committees which deal with chemical topics needing regulation, standardization or codification. It includes details of forthcoming international symposia which are to be sponsored by IUPAC together with reports of such meetings which have already taken place.

Two series of Appendices to the Bulletin are issued:

- (i) Appendices on Tentative Nomenclature, Symbols, Units, and Standards
- (ii) Technical Reports

In 1973 there will be three issues of the Bulletin (Nos. 45-47). The annual subscription, inclusive of postage, will be US \$9.00 or £3.00 (surface), US \$12.00 or £4.00 (by air). Subscribers are also sent the two series of Appendices automatically and free-of-charge.

Subscription orders may be placed direct, or through an agent, with the IUPAC Secretariat.



# **XXVII IUPAC CONFERENCE**

**MUNICH, 21-31 AUGUST 1973**

## **Accommodation and Travel**

Full details of hotel accommodation and various travel schemes have been distributed to National Adhering Organizations, to Associated Organizations, and to Titular and Associate Members and National Representatives of IUPAC bodies. Any queries should be addressed to the IUPAC Secretariat. There will be an IUPAC information desk at Munich airport and a registration desk at the hotel (see below).

## **Visas**

Conference participants are recommended to check at the German Federal Republic embassy in their respective countries on the necessity of obtaining a visa to travel to Munich. An official letter supporting a visa application may be obtained from the IUPAC Secretariat.

## **Schedule of Meetings**

Subject to last minute changes, the Schedule of Meetings is as shown on pages 3-10. Meetings will be held either at Holiday Inn in Leopoldstrasse or at Holiday Inn Olympic. The two sites are within walking distance of one another. As far as possible, Conference participants will be accommodated in the hotel at which their meetings will take place. Details of meeting rooms will be available on arrival at the hotels.

## **Secretariat**

Throughout the Conference the IUPAC Secretariat will be located at the Conference Room 'Theresa' at the Holiday Inn in Leopoldstrasse:

Telephone—0811 340971

Telex—05 215439

The Secretariat will be open daily from 0800 hours and provide typing, photocopying, and other services to assist Conference participants in their work.

## **Social Programme**

The possibility of holding a banquet during the Conference is being investigated. A reception for all participants will be given at the Rathaus by the Oberbürgermeister of Munich. A Ladies Programme is being planned.

## **Weather and Clothing**

The average temperature during August in Munich is 17 °C. Formal dress will not be essential for any of the social functions.

## **XXIV IUPAC Congress**

The Congress will take place at Hamburg from 3 to 8 September, *i.e.*, immediately after the Conference in Munich. The latest programme details are given elsewhere in this Bulletin (see pages 109-113). The joint IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies will also be held in Hamburg during the period 29-31 August (see pages 107-109).

An International Symposium on Plasma Chemistry is scheduled from 6 to 10 September in Kiel. The III International Conference on Chemical Thermodynamics has been arranged for 3-6 September in Baden near Vienna; in conjunction with this there will be a Conference on High Temperature Techniques. All of the above meetings are sponsored by IUPAC.

### **XXVI IUPAC Conference**

The proceedings of the IUPAC Conference held in Washington, DC, during July 1971, have been published as *Comptes Rendus XXVI Conference*. Copies are available from the IUPAC Secretariat at a cost of \$9.00 or £3.00 (postage free if payment with order).

# SCHEDULE OF MEETINGS FOR XXVII IUPAC CONFERENCE

(\*Denotes Joint Meeting)

Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
Council									10-12 14-18		10-12.30 14-18
Bureau								9-12 14-18			14-15
Executive Committee							9-12 14-18				15-16
Division Presidents										9-12	
Committee on Publications			9-12 14-18								
Committee on Teaching of Chemistry (Officers only)					9-12* 14-18*		14-18*				
Coordinating Committee for Analytical Methods			14-18*		14-18*						
Finance Committee						9-12 14-18					
Interdivisional Committee on Machine Documentation				9-12 14-18		9-12 14-18					
Interdivisional Committee on Nomenclature and Symbols	9-12					9-12					
CODATA Open Meeting							19-22				
Coordinating Committee and Section VI.1			14-18*		14-18*			14-18			



Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
<b>Clinical Chemistry Section</b>											
Section Committee							9-12 14-18				
Commission on Automation		9-12 14-18	9-12 14-18*								
Commission on Quantities and Units				9-12 14-18	9-12 14-18*	9-12 14-18					
Commission on Teaching				9-12 14-18	9-12* 14-18	9-12 14-18					
Clinical Chemistry Section (Officers) and Clinical Chemistry Commissions (Chairmen)	14-18										
Commission on Automation and Commission V.3			14-18*								
Commission on Quantities and Units and Commission I.1					14-18*						
Commission on Teaching in Clinical Chemistry and Committee on Teaching of Chemistry (Officers)					9-12*						
<b>Physical Chemistry Division</b>											
Division Committee	14-18						14-18	9-12 14-18			
Commission I.1: Physicochemical Symbols, Terminology, and Units		9-12 14-18*	9-12* 14-18*	9-12* 14-18*	9-12 14-18*	9-12*					



Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
<b>Physical Chemistry Division (continued)</b>											
Commission I.2 and Sub-Commission I.2.1					9-12*						
Commissions I.2 and I.4				9-12*							
Commissions I.3 and I.6				14-18*							
Commissions I.3 and V.5		14-18*									
Commissions I.6 and II.2			14-18*								
<b>Inorganic Chemistry Division</b>											
Division Committee		9-12*					9-12* 14-18				
Commission II.1: Atomic Weights		14-18	14-18	9-12	9-12 14-18*						
Commission II.2: Nomenclature of Inorganic Chemistry	9-12 14-18	14-18	9-12 14-18*	9-12* 14-18*	9-12 14-18	9-12 14-18					
Commission II.3: High Temperatures and Refractory Materials			9-12 14-18	9-12 14-18	9-12 14-18						
Division Committee and Commissions (Officers)		9-12*					9-12*				
Commission II.1 and Committee on Teaching of Chemistry (Officers)					14-18*						
Commissions II.2 and I.6			14-18*								
Commissions II.2 and III.1 (Officers)				9-12* 14-18*							



Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
<b>Organic Chemistry Division</b>											
Division Committee					9-12 14-18*	9-12 14-18	14-18				
Commission III.1: Nomenclature of Organic Chemistry (Officers only)				9-12* 14-18*							
Commission III.2: Chemical Taxonomy							9-12	9-12 14-18			
Commission III.3: Organic Photochemistry			9-12 14-18	9-12 14-18*	9-12	9-12					
Section III.4: Medicinal Chemistry			9-12 14-18	9-12 14-18	9-12	14-18					
Division Committee and Commissions/Section (Officers)					14-18*						
Commissions III.1 (Officers) and II.2				9-12* 14-18*							
Commissions III.3, I.1 and I.5				14-18*							
<b>Macromolecular Division</b>											
Division Committee		14-18	9-12 14-18	9-12 14-18	9-12*						
Commission IV.1: Macromolecular Nomen- clature					9-12 14-18	14-18	9-12 14-16	9-12 14-16	9-12 14-16		
Division Committee and Section VI.6 (Officers)					9-12*						

## Analytical Chemistry Division

Division Committee	9-12 14-18				9-12* 14-18	9-12 14-18
Commission V.1: Analytical Reactions and Reagents	9-12*	9-12 14-18	9-12 14-18	9-12 14-18		9-12
Commission V.2: Microchemical Techniques and Trace Analysis		14-18		9-12 14-18*	9-12 14-18	9-12 14-18
Commission V.3: Analytical Nomenclature	14-18	9-12 14-18	9-12 14-18	9-12* 14-18*	9-12 14-18	9-12 14-18
Commission V.4: Spectrochemical and Other Optical Procedures for Analysis	9-12 14-18	9-12 14-18	9-12 14-18	9-12* 14-18*	9-12 14-18	9-12 14-18
Commission V.5: Electroanalytical Chemistry	14-18*	9-12 14-18	9-12 14-18	9-12* 14-18*	9-12 14-18	9-12 14-18
Commission V.6: Equilibrium Data	9-12*	9-12 14-18	9-12 14-18	9-12* 14-18*	9-12 14-18	9-12 14-18*
Commission V.7: Analytical Radiochemistry and Nuclear Materials		9-12		14-18	9-12	9-12 14-18*
Division Committee (Secretary) and Commissions (Secretaries)	9-12 14-18					
Division Committee and Commissions (Chairmen)					14-18*	9-12*
Division Open Meeting						9-12*
Commission V.1 and Section VI.1	9-12*					





Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
<b>Applied Chemistry Division (continued)</b>											
Section VI.3: Oils and Fats		9-12 14-17*	9-12 14-18	9-12 14-18*	9-12 14-18	9-12					
Section VI.4: Air Quality		9-12 14-18		9-12 14-18	9-12	9-12					
Section VI.5: Pesticides		9-12 14-17* 19-22*	9-12				9-12				
Commission VI.5.1: Terminal Pesticide Residues			14-18	9-12 14-18							
Commission VI.5.2: Pesticide Residue Analysis					9-12 14-18	9-12					
Section VI.6: Organic Coatings			14-18	9-12 14-18	9-12* 14-18	9-12					
Section VI.7: Water Quality			9-12 14-18	9-12* 14-18	9-12 14-18						
Division Committee and Sections (Officers)	9-12										
Division Open Meeting						14-18*					
Section VI.1 and Commission V.1		9-12*									
Sections VI.1 and VI.2		14-17*									
Sections VI.1 and VI.3				14-18*							
Sections VI.1 and VI.5		19-22*									
Sections VI.2 and VI.7				9-12*							
Sections VI.3 and VI.5		14-17*									
Section VI.6 (Officers) and Macromolecular Division Committee					9-12*						

## REPORTS OF DIVISION PRESIDENTS AND CLINICAL CHEMISTRY SECTION

The following reports of activities since the XXVI IUPAC Conference (Washington, DC, 1971) were presented at the Bureau meeting in Strasbourg on 24-25 September 1972.

### PHYSICAL CHEMISTRY DIVISION

#### Commission I.1: Physicochemical Symbols, Terminology, and Units

The main work of the Commission at present was cooperation with and coordination of the efforts of other Commissions to prepare Appendixes to the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* (the Green Book) in their respective fields. Commissions I.2, I.3, and I.6 were currently at work on Appendixes dealing with thermodynamics, electrochemistry, and heterogeneous catalysis, respectively. Prof. M. L. MCGLASHAN, past Chairman of the Commission and current IUPAC representative on the ISO/TC 12 Advisory Panel (Symbols and Units) attended a meeting of that body in May 1972 and had reported thereon to IUPAC.

A current trend was to be noted. Groups of specialists, both IUPAC and nonIUPAC, were producing documents which contained recommendations for symbols and units or for presentation of data in the literature. The IUPAC *imprimatur* was being sought for many of these. Commission I.1 was able to review some of these but better mechanisms were needed to ensure consistency of all such IUPAC recommendations.

#### Commission I.2: Thermodynamics and Thermochemistry

The revised 'Guide to Procedures for the Publication of Thermodynamic Data' had appeared in *Pure and Applied Chemistry* [29 (1-3), 395 (1972)] and had been translated into French, German, Japanese, and Russian. The first volume of the series *International Thermodynamic Tables of the Fluid State*, entitled 'Argon 1971', was now available. The preparation of several other volumes was well advanced. The advisory group for the Tables was now being reorganized as Sub-Commission I.2.2. The book *Experimental Thermodynamics, Vol. II* (Editor, Prof. B. VODAR) still lacked a few chapters. Issue No. 15 of *Bulletin of Thermodynamics and Thermochemistry* (May 1972) had appeared. It continued its regular increase in size.

Preparations for an International Conference on Plasma Chemistry (Kiel, 6-10 September 1973) and the III International Conference on Chemical Thermodynamics (Baden, 3-6 September 1973) were progressing well.

Commission I.2 was working with Commission I.1 to consider current symbolism in chemical thermodynamics and with Commission I.4 on standard reference materials for calorimetry.

The Inter-Union *ad hoc* Committee, chaired by Dr. I. WADSÖ of Commission I.2, should be ready to report in 1973 on the proposed Inter-Union Commission on Critical Compilation of Thermodynamic Data for Biochemical Processes and Reactions. The participating Unions were IUB, IUPAB, and IUPAC.

### Commission I.3: Electrochemistry

The main activity had been on the draft document 'Electrochemical Definitions and Symbols' which would eventually become one of the Appendixes to the *Manual of Symbols and Terminology for Physicochemical Quantities and Units*. This document had been circulated to the Commission for final approval before publication as a tentative IUPAC recommendation. As part of the effort of the Commission to stimulate preparation and publication of tables of data, Dr. R. TAMAMUSHI had published in *Electrochimica Acta*, as a preprint to the final document, 'Kinetic Parameters of Electrode Reactions'. This manuscript would be discussed at the XXVII IUPAC Conference (1973).

### Commission I.4: Physicochemical Measurements and Standards

The 'Catalogue of Physicochemical Standard Substances', previously published in tentative form, had now appeared in *Pure and Applied Chemistry* [29 (4), 597 (1972)]. A paper by Drs. D. AMBROSE and I. J. LAWRENSON on the vapour pressure of water had been published. The Commission would consider the data therein for possible adoption as an IUPAC standard.

The Task Group on Standard Calibration Substances met in Zeist on 9-10 June 1972. The work of 12 teams of experts, each responsible for one or more properties, was reviewed. A draft introductory chapter for the entire work was discussed. A draft of Section V (Calorimetry) was accepted for consideration by the Commission. The work of this large project was developing satisfactorily.

### Commission I.5: Molecular Structure and Spectroscopy

'Recommendations for the Presentation of Raman Spectra for Cataloging and Documentation in Permanent Data Collections' had undergone the required 8-month worldwide review period and was now ready for final approval as an IUPAC recommendation. The final version of 'Recommendations for the Presentation of NMR Data for Publication in Chemical Journals' had been published in *Pure and Applied Chemistry* [29 (4), 625 (1972)]. 'Tables of Wavenumbers for Calibration of Infrared Spectrometers in the 600-20  $\text{cm}^{-1}$  Range' was in press in the IUPAC journal.

Working with Commission I.1, Section 2.8 (Light and Related Electromagnetic Radiation) of the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* had been completely revised and published in June 1972 as Tentative Nomenclature Appendix No. 24 to the *Information Bulletin*.

The Commission was involved with outside groups, in establishing guidelines for the results in Mössbauer and photoelectron spectroscopy.

A Sub-Commission on Mass Spectroscopy had been authorized but its membership was not yet established.

### Commission I.6: Colloid and Surface Chemistry

Part I of the definitive version of the 'Manual of Symbols and Terminology for Colloid and Surface Chemistry' had just appeared in *Pure and Applied Chemistry* [31 (4), 577 (1972)]. This was another in the series of Appendixes to the *Manual of Symbols and Terminology for Physicochemical Quantities and Units*. The project group on 'Nomenclature for Heterogeneous Catalysis' met at Palm Beach, Florida, during August 1972 and hoped to have a tentative



manual ready for consideration at the XXVII IUPAC Conference (1973). The project group on 'Nomenclature for Zeolites and Molecular Sieves' was continuing its work by correspondence.

The IUPAC-SCI project group had received the results of surface area determinations on 8 reference samples from participating laboratories. Most of the chapters for the work textbook had been received and were under review. A list of educational films in the area of colloid and surface chemistry was being reviewed.

G. WADDINGTON

## INORGANIC CHEMISTRY DIVISION

The Officers of the Division met in Vienna on 16 May 1972. The following items were discussed:

- (i) It was unanimously agreed to support the suggestion in a letter of the Deutscher Zentralausschuss für Chemie that the Office of Secretary General of IUPAC be abolished.
- (ii) XVI International Conference on Coordination Chemistry (Dublin, 19-24 August 1974) and intended IV International Conference on Non-aqueous Solvents (Vienna, 1974). For the latter Conference Prof. V. GUTMANN asked for financial support.
- (iii) It was concluded that in 1973 all Commissions of the Division should hold a meeting. This seemed to be justified because in 1972 the Commission on High Temperatures and Refractory Materials might have to postpone its meeting for financial reasons. Furthermore, the Division had only three Commissions so that, from this point of view, a meeting of all Commissions seemed to be justified.
- (iv) The order forms for offprints of
  - (a) 'Analysis of Interlaboratory Measurements on the Vapour Pressure of Gold'
  - (b) 'Analysis of Interlaboratory Measurements on the Vapour Pressure of Cadmium and Silver'were discussed and completed according to the wishes of Dr. W. S. HORTON, Chairman of the Commission on High Temperatures and Refractory Materials.
- (v) The II Symposium on Inorganic Phosphorus Compounds (Prague, September 1974) had the requisite standard for sponsorship by IUPAC. It was concluded that the papers of the main lectures would be worth publishing in the IUPAC journal *Pure and Applied Chemistry*.
- (vi) The VI International Conference on Organometallic Chemistry (Amherst, Massachusetts, 12-17 August 1973) would be of the standard commensurate for granting IUPAC sponsorship.

### Commission II.1: Atomic Weights

The activities were presently restricted to general work of the Commission by correspondence, along the lines outlined to the XXVI IUPAC Conference in Washington (1971). The report 'Atomic Weights of the Elements 1971' had now appeared in *Pure and Applied Chemistry* [30 (3-4), 637 (1972)]. The Commission would have nothing definite to report until its plenary meeting in Munich next year.

## Commission II.2: Nomenclature of Inorganic Chemistry

The second edition of *Nomenclature of Inorganic Chemistry* (the Red Book) had now appeared, both in *Pure and Applied Chemistry* [28 (1), 1 (1971)] and as a separate volume. Extended rules for the 'Nomenclature of Inorganic Boron Compounds' had also appeared in *Pure and Applied Chemistry* [30 (3-4), 681 (1972)]. Satisfactory agreement was reached, at a meeting in London in October 1971, by the sub-committee set up with the Commission on Nomenclature of Organic Chemistry to finalize the tentative version of rules for organic derivatives of the elements which would appear eventually as *Nomenclature of Organic Chemistry, Section D*. The Commission was considering by correspondence names for elements 104, 105, *etc.*; nomenclature of ring and chain compounds; and the table of names for ions, radicals, *etc.* Various smaller project groups mentioned in the minutes of the Washington meeting were at work by correspondence.

## Commission II.3: High Temperatures and Refractory Materials

Holding of a nonConference year meeting in Autumn 1972 was earlier in doubt because of insufficient IUPAC funds. It was now planned to take place without the financial support of IUPAC. Reports on the vapour pressure standards, gold, silver, and cadmium, had been published in *Pure and Applied Chemistry* [31 (3), 371 and 395 (1972)]. Data for the proposed standards tungsten and platinum were currently under examination and a draft report was expected soon. A new project group had been assembled for melting points investigations (eight members representing six countries). A preliminary sample of pure yttrium oxide was being considered for distribution. The number of subscribers to the *High Temperature Bibliography* had remained at about the previous year's figure of 400. Although the publication still showed a deficit, the subscription had been raised only about 8% to cover approximately recent currency devaluations. Complete recovery of the deficit would have required doubling the subscription. This had been avoided by withdrawing the publishing operation from a commercial firm and transferring it to Imperial College, London. Production costs had been reduced by a factor of three and decreased the publishing time as well. There were now 20 honorary compilers in 13 countries and it was on the generous efforts of these and the editor, Dr. M. G. HOCKING, that the Bibliography depended. The paper 'Limitations in Applying Mass Spectrometry to High-Temperature Equilibrium Studies' of Prof. F. E. STAFFORD had been published [*High Temperatures—High Pressures*, 3, 213 (1971)]. This was in accord with discussions at the July 1971 meeting of the Commission. The Conference on High Temperature Techniques to be chaired by Prof. C. B. ALCOCK had suffered some uncertainties due to an unexpected conflict with the III International Conference on Chemical Thermodynamics. This had now been cleared up so that the two conferences were scheduled to be held jointly at Baden on 3-6 September 1973. This moved the High Temperature Conference out of the XXIV IUPAC Congress, a fact that both the Commission Chairman and Prof. ALCOCK greatly regretted and which had caused a mild embarrassment with Gesellschaft Deutscher Chemiker.

O. GLEMSE

## ORGANIC CHEMISTRY DIVISION

The reelection of Prof. P. YATES (Canada) to Membership of the Division Committee at the XXVI IUPAC Conference (1971) was not accepted by the Bureau for statutory reasons. He had, therefore, been invited to take part in the Committee's work as a Coopted Member.

In recent years the policy of the Division had been to set up a worldwide series of symposia of two types: highly specialized ones, at irregular intervals, and serial ones covering wider areas. The Symposia on the Chemistry of Natural Products were the first series to be regularly organized, every second year. The VIII Symposium was held in New Delhi in February 1972. In July 1972 the IV Symposium on Photochemistry took place in Baden-Baden, and in September 1972 in Crans-sur-Sierre the I Conference on Physical Organic Chemistry, for which the Division Committee could claim to have taken the initiative. The I IUPAC Symposium on Synthetic Organic Chemistry, which the Division Committee had also fathered but which was not yet born, would complete for the time being the envisaged serial symposia.

Specialized symposia were, of course, very varied, and some showed a tendency towards recurrence (e.g., III Carotenoids and VI Carbohydrates, both of which were also held in 1972). During July 1972, another type of symposium was tried, the IUPAC Symposium on Chemistry in Evolution and Systematics in Strasbourg. It was the most interdisciplinary meeting in which the majority of the participants had taken part: botanists, entomologists, geologists, met with chemists and found a common language. This might encourage other attempts at bridging gaps.

However, it must be stressed that while IUPAC sponsorship might in some countries help the organizers to obtain local funds, the restrictions presently placed on IUPAC subventions might force the Division to abandon its policy of actively suggesting symposia to potential organizers, at a great loss to the international distribution of chemical meetings.

### Commission III.1: Nomenclature of Organic Chemistry

The Commission would meet at Villefranche-sur-Mer in September 1972. Important items to be discussed included Section D (organo-element compounds) of *Nomenclature of Organic Chemistry* (the Blue Book); a condensed version of the 1971 edition of the Blue Book (combined Sections A, B, C); general rules for natural products; special nomenclature for natural products (cannabinoids, tetrapyrrole derivatives, indole alkaloids, lignins).

The publication of Section D, as a tentative version, would have been already under way were it not for major dissent with some of the interested inorganic chemists over the definition of valence and related concepts which had been used widely in organic replacement nomenclature. A compromise had been worked out by a sub-committee with the Commission on Nomenclature of Inorganic Chemistry. The difficulties encountered in this joint work might well serve a useful purpose if they could help in an analysis of their origin and show the way to avoid them in future. Such an analysis was being undertaken by the Commission.

'Definitive Rules for Nomenclature of Steroids', prepared jointly with the IUPAC-IUB Commission on Biochemical Nomenclature (CBN), had been published in *Pure and Applied Chemistry* [31 (1-2), 283 (1972)]. The tentative version of 'Rules for Nomenclature of Carotenoids', also prepared jointly with CBN, had appeared as Tentative Nomenclature Appendix No. 19 (February 1972) to the *Information Bulletin*.



CBN, which was attached jointly to the Organic Chemistry and Macromolecular Divisions in the case of IUPAC, had issued 'Nomenclature of Multiple Forms of Enzymes' and 'Symbols for Amino-Acid Derivatives and Peptides' as Tentative Nomenclature Appendices Nos. 22 and 23 (June 1972), respectively, to the *Information Bulletin*.

### Commission III.2: Chemical Taxonomy

The two main concerns had been the organization of the Symposium on Chemistry in Evolution and Systematics and the relationship of the Commission with other bodies. The Symposium was an unqualified success in spite of a rather low attendance (about 120 participants). The interest and general high level of discussion between the participants representing several different disciplines was remarkable, and pointed to the need for some continuing organization to plan further meetings of this sort. Attempts by the Commission to work towards this end through an *ad hoc* (IUPAC-IAPT) Committee for International Organization for Chemosystematics had been somewhat frustrated by the fact that the Committee had so far been unable to meet and that attempts to engender support through circulation of the aims of the *ad hoc* Committee in a large number of periodicals and to a number of national societies had not elicited any new support in strength: it remained enigmatic whether anything further could be done in this way. The Commission had, therefore, recommended dissolution of the *ad hoc* Committee and decided to ask Prof. T. MABRY (USA) to try to establish a continuing organizing Committee, and to invite Prof. P. FEENY (USA), Dr. J. B. HARBORNE (UK), Prof. E. SCHOFFENIELS (Belgium), Prof. N. FARNSWORTH (USA), Prof. P. O. LARSEN (Denmark), Prof. W. B. GRANT (Canada), and Dr. J. MEARS (USA) to participate. This new Committee, which would be independent of IUPAC and IAPT, would consider continuing and extending the work of the Commission, especially in regard to the organizing of symposia of the Strasbourg type.

The Commission had also, at a meeting in Strasbourg, considered the question of publications in its field. The *Scott-Devon Index of Natural Products* had been published in part, but although of value to chemists it was of little use in chemotaxonomy. Due to the fact that Dr. DEVON had now left Yale, collaboration between this group and Prof. FARNSWORTH in Chicago would be difficult to organize, and neither had contacted Dr. MEARS as had been suggested by the Commission. It was agreed that the question of publishing a proper annual report of the occurrence of compounds (known and unknown) in various plant taxa was the most pressing problem facing the Commission. A solution appeared to be under way thanks to contacts taken by Prof. MABRY.

### Commission III.3: Organic Photochemistry

The first meeting of the reorganized Commission took place during the IV Symposium on Photochemistry. The report of the previous Membership (Hammond Commission) was considered at some length. The arguments presented by Prof. G. S. HAMMOND that organic photochemistry should not operate in isolation from other related areas (inorganic photochemistry, photophysics, photobiology, and theoretical chemistry) were regarded as sound. The new Members did not, however, share the conclusion that there was no need for a Commission on Organic Photochemistry. In fact, it was concluded that in the near future IUPAC might form an Interdivisional body devoted to photochemistry as a science with appropriate sub-groups.

Fundamentally, the Commission saw itself as a bridge between organic chemistry and photochemistry. Its aims were:

- (i) Promotion of symposia which stimulated the development of photochemical knowledge and provided a forum for discussion of current problems.
- (ii) Coordination of photochemical meetings sponsored by IUPAC and other agencies.
- (iii) Education of organic chemists in the photochemical expertise required for utilization of photochemical techniques in laboratory and industrial synthesis.
- (iv) Recommendation of standard nomenclature for the photochemical literature. This function should be performed in conjunction with other areas of photochemistry, especially photophysics and photobiology.
- (v) Education of graduate and postdoctoral students in the science of photochemistry.

Vigorous support of the highly successful IUPAC sponsored symposia initiated in 1964 by Prof. HAMMOND would contribute to goals (i), (iii), and (v). Organization of symposia at IUPAC Congresses would also contribute to these goals, especially (iii) and (v). The Hammond-initiated symposia were devoted to photochemical problems and properly dealt with all areas of photochemistry. The symposia held at IUPAC Congresses were part of the Organic Chemistry Division and should reflect this interest in selection of the programme. It was planned to organize a symposium for the XXV IUPAC Congress (1975).

It was recommended that the Commission be expanded from four to six Titular Members, Prof. T. MUKAI (Japan) and Dr. A. LAMOLA (USA) being suggested for the new positions. Prof. MUKAI's appointment would recognize the rapidly developing interest in organic photochemistry in Japan; Dr. LAMOLA's appointment would provide the Commission with expertise in those areas of organic photochemistry which overlapped with photobiology.

#### **Section III.4: Medicinal Chemistry**

The Section planned to meet in Milan during September 1972. The Chairman and Secretary met in March 1972 to plan the agenda for the Milan meeting. Items of importance included reports of various *ad hoc* Committees, important discussions of Section finance, and discussion of the election procedures. It was to be noted that seven Titular Members, a new Chairman and a Secretary were to be elected in 1973. A survey of available new Members must be prepared before that time.

Concern of the Section for proper nomenclature to be used in reference to nonproprietary drugs had led to a meeting between its Chairman, Prof. E. CAMPAIGNE, and Dr. O. WALLEN, Chief Pharmaceutical Officer of WHO, in September 1971 in Washington, DC. It was anticipated that much of the problem might be eliminated by informal exchange of information between Dr. C. T. VAN MATER, who prepared the chemical names for INN, and Dr. K. L. LOENING, of Chemical Abstracts Service, who also represented IUPAC nomenclature interests.

Prof. A. ALBERT had attended the ICSU Scientific Committee on Problems of the Environment (SCOPE) meeting in September 1971 in Canberra. Two matters of interest to the Medicinal Chemistry Section were discussed: (i) the adoption of a recommendation that an International Register be compiled

of all chemicals manufactured in amounts greater than 500 kg; (ii) problems of narcotics abuse.

The *ad hoc* Committee on Meetings and Symposia, chaired by Prof. E. J. ARIËNS, had been active regarding the programme for the Medicinal Chemistry Symposium at the XXIV IUPAC Congress (Hamburg, 1973). This *ad hoc* Committee continued to receive numerous requests for IUPAC recognition and financing of medicinal symposia and must be very selective in its actions.

The Secretary, Dr. A. I. RACHLIN, had maintained contact with various corresponding organizations of the Section. Two newsletters had been issued (No. 4 in December 1971, No. 5 in June 1972) with an excellent response. They seemed to fill an information gap for scientists involved with medicinal chemistry. It should be noted that Newsletter No. 4 contained a list of 50 international meetings in the next two years of interest to medicinal chemists. Also, Section Members had been concerned with information regarding the introduction of new chemical compounds and drugs internationally. Newsletter No. 4 carried for the first time a list of new chemical entities which had been introduced as single drugs in France, Germany, Italy, Japan, Switzerland, UK, and USA. A second list appeared in Newsletter No. 5. The Division was indebted to Mr. P. DE HAEN for supplying information regarding these new drug entities.

The *ad hoc* Committee on Education, chaired by Prof. E. E. SMISSMAN, continued to be active in surveying educational methods applied to the field of medicinal chemistry, and a second interim report would be presented at the Milan meeting.

The report of the *ad hoc* Committee on Bad Patent Practices, presented at the Washington meeting in 1971, had subsequently been published in *Information Bulletin* No. 41 (November 1971, p. 16).

G. OURISSON

## MACROMOLECULAR DIVISION

The Division had sponsored the International Symposium on Macromolecules in Helsinki during July 1972. This particular meeting was divided into five sections with 30 main lectures and a large number of short communications. The general opinion was that the Symposium had been very successful, but it was perhaps too luxurious. The Division had also collaborated in the II Discussion Conference on Macromolecules (Prague, August 1972), the theme being 'Macromolecular Matrices and Carriers of Biological Functions'.

As regards Microsymposia, the Division had sponsored the following:

VIII Prague Microsymposium: Morphology of Polymers (August/September 1971)

IX Prague Microsymposium: Thermodynamics of Interactions in Polymer Solutions (September 1971)

Photochemical Processes in Polymer Solutions (Louvain, June 1972)

X Prague Microsymposium: Conformational Structure of Polymers (August 1972)

XI Prague Microsymposium: Mechanism of Inhibition Processes in Polymers—Oxidation and Photochemical Degradation (September 1972)

During the Helsinki Symposium the Division Committee met twice. Future International Symposia on Macromolecules were planned as follows:

Hamburg, September 1973

Aberdeen, September 1973

Rio de Janeiro, July 1974



Madrid, September 1974  
Japan, 1977

In addition, the following Microsymposia were being organized:

Advances and Future of Macromolecular Science: High Tatras,  
May 1973

Prague, 1973 (nonoverlap with Macrosymposia and XXVII  
IUPAC Conference)

Israel (Dr. MICHAËLI, Weizmann Institute, Rehovot)

The Working Party on Molecular Characterization of Polymers had met in Strasbourg (November 1971) and planned to meet in Brussels at the end of October 1972. A multilaboratory programme was being undertaken on degree of branching in low and high pressure polyethylene. A change in name had been agreed for the other Working Party of the Division, viz. from 'Relationship of Performance Characteristics to Basic Parameters of Polymers' to 'Structure and Mechanical Properties of Commercial Polymers'. This Working Party had met twice since the XXVI IUPAC Conference: at Antony (Seine) in November 1971 and at Bollate during May 1972. A second report on 'A Collaborative Study of the Dynamic, Mechanical, and Impact Properties of PVC' was being prepared for publication [the first part appeared in *Pure Appl. Chem.*, **18** (4), 553 (1969)].

The Division had been asked to consider reconstituting its two Working Parties as Commissions. Thus, Council at Washington in 1971 had approved the appointment of an *ad hoc* Committee to study the need for a Commission on Molecular Characterization of Polymers. However, the Division Committee had now concluded that the requested transformations were not in the best interests of IUPAC: the present efficiency of working might be endangered and Commissions required budgetary provision from IUPAC for their meetings.

The statement that the Division did not wish to form Commissions based on particular industrial fields had been reaffirmed. This meant that the Section on Organic Coatings could not be transferred in its present form from the Applied Chemistry Division to the Macromolecular Division.

#### **Commission IV.1: Macromolecular Nomenclature**

The Commission met during June 1972 at Knokke-Zoute. The document 'Nomenclature of Regular Single-strand Organic Polymers' was finalized for publication in 1972 as a Tentative Nomenclature Appendix to the *Information Bulletin*. Discussion of 'Tentative Rules for Stereochemical Nomenclature of Polymers' had reached an advanced stage and should be concluded at the XXVII IUPAC Conference (1973).

H. BENOIT

#### **ANALYTICAL CHEMISTRY DIVISION**

The reductions in expenditure budgetted for 1972 had inevitably led to a reduction in the rate of progress of work in the Division; some meetings had been cancelled and others restricted. However, thanks to the generosity of various organizations, it had been possible for the Division Executive Committee and Commissions V.1 and V.7 to meet and meetings of Commissions V.3 and V.6 were scheduled to take place later in the year.

Progress was being made in collaboration with ISO, particularly ISO/TC 47. Draft ISO standards were being received for comment and ISO/TC 47

had been informed of the activities of the Division. A representative of the Division attended the ISO/TC 47/SC 3 meeting.

### **Commission V.1: Reactions and Reagents**

Work continued, in collaboration with Section VI.1, on analytical methods for the control of food additives in fulfillment of the IUPAC/CEE contract. During 1971, 23 methods were prepared and, in 1972, 43 methods including some revisions. In addition, good progress had been made on additional projects authorized at the Washington Conference. A study on the determination of phenols had been completed; reports on the identification and determination of amines and polyphenols were nearing completion, and one on redox indicators was being circulated for comment.

### **Commission V.2: Microchemical Techniques and Trace Analysis**

The Commission had six projects on organic microanalysis. Studies on accuracy and precision in the determination of carbon and hydrogen in compounds containing heteroelements and of metals in organometallic compounds were nearing completion; work on the determination of carbon, hydrogen, and nitrogen in organometallic compounds was making good progress.

A study on mass absorption coefficients used in electron beam microanalysis was still in progress and it was expected to be completed soon.

The Commission's work on trace analysis was expanding and progressing well. Two draft reports under the general heading 'Trace Analysis Applicable to the Determination of Minor Impurities in Chemicals' had been reviewed by the Division Committee. The first, a general survey, was being translated into English and the second, on trace impurities in oxygen and helium, was to be revised and, if possible, expanded. A further project under this general heading dealing with trace analysis of high purity mineral acids was proceeding. Further work, with the collaboration of selected specialized laboratories, on certain analytical methods was to be done. A study of difficulties in the destruction of organic matter for preconcentration of elements was being made; when this was complete, selected methods of destruction would be studied in detail. Possible sources of standards for trace analysis had been established and their usage in various countries was being investigated. An evaluation of methods of calibration in trace analysis was in progress.

Reports: Erreurs en Microanalyse organique elementaire: *Pure Appl. Chem.*, **29** (1-3), 409 (1972); **29** (4), 629 (1972); **30** (1-2), 301 (1972)

Study on Purification of Chemicals for Trace Analysis: *IUPAC Inf. Bull.*, Nos. 42/43, July 1972, pp. 23-26

### **Commission V.3: Analytical Nomenclature**

As could be seen in the list below, five projects had reached the stage of publication as tentative reports. A revised draft report on the use of the concepts of normality and molarity and a draft report on selectivity index would be considered later this year. Projects on the presentation of analytical papers for publication and kinetic methods of analysis were being actively pursued. The published nomenclature for liquid-liquid extraction was to be reconsidered in order to assess whether a revision of the earlier report was necessary.

Reports: Recommendations on Ion Exchange Nomenclature: *Pure Appl. Chem.*, **29** (1-3), 617 (1972)

Appendices to the *Information Bulletin*, February 1972—

- No. 14 Recommendations on Nomenclature for Contamination Phenomena in Precipitation from Aqueous Solutions
- No. 15 Recommendations on Nomenclature for Chromatography
- No. 16 Recommendations for Nomenclature of Thermal Analysis
- No. 17 Recommendations for Nomenclature of Mass Spectrometry
- No. 18 Recommendations on Nomenclature of Scales of Working in Analysis

#### **Commission V.4: Spectrochemical and Other Optical Procedures for Analysis**

The Commission was continuing work on its series of reports under the general heading of 'Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis'. Owing to the illness of the project leader, preparation of a draft report on terms and symbols related to analytical functions, sensitivity, limit of detection, accuracy, and precision had been delayed, but should soon be ready for circulation. A draft report on analytical flame spectroscopy and associated procedures was nearly ready for Division approval for publication as a tentative report.

Two further projects, nomenclature of analytical X-ray spectroscopy and associated procedures and the systematic classification and description of spectrochemical radiation sources were making progress.

Report: Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis, Part I: General Atomic Emission Spectroscopy: *Pure Appl. Chem.*, **30** (3-4), 651 (1972)

#### **Commission V.5: Electroanalytical Chemistry**

The Commission was continuing its work on purification of selected organic solvents and further reports, on *N*-methylpropionamide and sulfolane, were nearing completion. Reports on purification of background electrolytes were also expected shortly. Compilations of halfwave potentials in *N,N*-dimethylformamide and sulfolane and of pK values in *N,N*-dimethylformamide were expected at the end of the year. Other projects of the Commission, all of which were making good progress, included studies on pretreatment of solid electrodes, conditional diffusion coefficients, a recommended symbol for the medium activity coefficient, standardization of ion-selective electrodes, electroanalytical methods in environmental analysis, standard reference materials for calibration of electroanalytical techniques, and standard potentials in fused salts.

A report on the status of the Faraday constant as an analytical standard was ready for submission for publication. A report on the classification and nomenclature of electroanalytical techniques, submitted for publication as a tentative report, was held up pending resolution of differences between the Commission and the Interdivisional Committee on Nomenclature and Symbols.

Reports: Purification of Dimethylsulfoxide for Electrochemical Experimentation: *Pure Appl. Chem.*, **25** (2), 457 (1971)

Pyridine: Purification and Tests for Purity: *Pure Appl. Chem.*, **27** (1-2), 265 (1971)



Propylene Carbonate: Purification and Tests for Purity: *Pure Appl. Chem.*, **27** (1-2), 273 (1971)

N-Methylacetamide: Purification and Tests for Purity: *Pure Appl. Chem.*, **27** (1-2), 281 (1971)

Selected Constants: Oxidation-Reduction Potentials of Inorganic Substances in Aqueous Solution: Supplement to *Pure Appl. Chem.*, 1971

### **Commission V.6: Equilibrium Data**

Data were being collected for inclusion in a proposed second supplement to the second edition of *Stability Constants*. A series of reports on distribution equilibria were in various stages—a report on organophosphorus extractants was undergoing the Division approval procedure, one on alkyl-amine extractants was expected to be finalized by the Commission very soon, whilst those on chelating extractants and oxygenated extractants were in draft form within the Commission. The project on critical surveys of solution equilibrium constants was progressing in parts; the introductory chapter and those on cyanide complexes and organophosphorus extractants were nearly complete. Preliminary drafts of reports on symbols and terms for mixed ligand constants and on ion exchange constants had been prepared. A group in the Commission had examined the possibilities of setting up a project on solubility data which would be discussed by the Commission.

### **Commission V.7: Analytical Radiochemistry and Nuclear Materials**

The final version of a report on the application of high energy activation to analysis would shortly be submitted for Division Committee approval; a report on light element analysis by radioanalytical methods was expected to be finalized next year. The Commission had been investigating possible suitable materials as reference materials for trace analysis by nuclear methods. A project on nuclear materials analysis, formerly centred on the analysis of uranium oxides and graphite, might have to be widened in scope to do justice to the subject and proposals would be made at the next Conference. Drafts of reports on methods of analysis of fissile elements and separation techniques in radioanalytical chemistry would be ready for discussion at the next Conference. Good progress was being made on reports on conventions for flux monitoring, information sources for analytical radiochemistry, nuclear methods for the determination of key elements in pollution problems, and the second part of a report on nomenclature.

Reports: Radioactive Tracers in Inorganic Chemical Analysis: *Pure Appl. Chem.*, **26** (2), 257 (1971)

Preparation of Reference Samples for Uranium in Low Grade Ores: *Pure Appl. Chem.*, **27** (1-2), 291 (1971)

Recommendations on Nomenclature for Nuclear Chemistry: *IUPAC Inf. Bull.* Appendix 25, June 1972

W. KEMULA

## APPLIED CHEMISTRY DIVISION

During the past year considerable effort had been made by correspondence to resolve problems which had arisen in the Sections because of the reorganizations effected in 1971. A meeting of the Division Committee along with the Chairmen of each of the seven Sections was being held just prior to the Bureau meeting in Strasbourg in September 1972, in order to discuss current problems and future plans for the Sections, for the Commissions, and for the Division.

### Section VI.1: Food

The Food Section was currently concerned with the arrangements, on behalf of IUPAC and jointly with IUFOST, of a joint symposium on Contribution of Chemistry to Food Supplies, to be held in Hamburg in August 1973; with the progress jointly with the Analytical Reactions and Reagents Commission of the Analytical Chemistry Division, of the 1972 IUPAC/CEE contract for methods for the purity of food additives; and through its two Commissions with the progression of a number of analytical problems of current interest. All these matters were considered when the Section met at Kungälv during August 1972.

The Commission on Food Additives (VI.1.1) was concerned with the continued study of methods for traces of polynuclear aromatic hydrocarbons in food, with the development of specifications for dispersion solvents used in the food industry, and with an evaluation of the problems in international trade in assessing the levels of feed additives (including synthetic hormones) in foods. It had recently published 'Recommended Method for Benzo(a)pyrene in Foods' and 'A Survey of Analytical Procedures for Traces of *N*-Nitrosamines in Foods' as Technical Report Appendices Nos. 4 and 5 (February 1972), respectively, to the *Information Bulletin*. Reviews had been prepared of methods for estimating polyphosphates, nitrites, nitrates, potential precursor amines, and traces of *N*-nitrosamines in foods.

The Commission on Food Contaminants (VI.1.2) was concerned with revision of the published IUPAC methods for determination of traces of copper, lead, and total mercury in food and with reviewing methods for traces of cadmium. An international symposium on Control of Mycotoxins, organized by the Commission, was held in Kungälv in August 1972 in conjunction with the Food Section meeting. It had also prepared for publication a report on a collaborative study of the stability of standards of Aflatoxin  $M_1$ . The Commission was, jointly with the Fermentation Industries Section, looking into a number of analytical problems relating to the safety-in-use evaluation of novel single cell proteins (SCP) of microbial origin of interest to the Protein Advisory Group of FAO/WHO/UNICEF. This included consideration of true protein, ribonucleic acid, digestibility, essential amino-acids, lipids and their constituent fatty acids, and hydrocarbons.

### Section VI.2: Fermentation Industries

The highlight of the past year's activities for this Section was the IV International Fermentation Symposium held in Kyoto in March 1972. This Symposium was sponsored by the Section and attracted more than 1,000 participants from 46 different countries, including 112 from USA, 253 from other foreign countries, and 648 from Japan. The programme included 20 focal topic sessions and 16 general paper sessions, covering topics such as

production of SCP, applications of microbiology to waste treatment and disposal, and progress in the fundamentals of microbial physiology and biochemical engineering.

The Section also met in four working sessions in Kyoto during the period of the Symposium. Matters discussed included official representation at the International Symposium on Advances in Microbial Engineering to be held in Czechoslovakia in August 1972. A report on recommended curricula for various fields of bioengineering was presented.

The Section discussed at great length a programme on standards for edible protein of microbial origin (SCP). A preliminary report was drafted, then redrafted for submission to the Food Section for advice and comment. The Section also engaged in a general discussion on microbiological aspects of effluent purification which were fundamental to the disposition and stabilization of organic wastes. Attempts had been made to discuss this subject in the symposium on Modern Methods for Treatment of Waste Water in Theory and Practice in the XXIV IUPAC Congress (1973). Among the purposes of such a discussion would be to attempt to determine the desirability for arranging another symposium at a later date to deal with microbial aspects of waste purification and stabilization.

### **Section VI.3: Oils and Fats**

The activities of the Section were focussed on standardization of methods of analysis in the field of oils, fats, and soaps. Many international organizations, like ISO, IDF, IASC, were adopting these methods. In addition, the FAO/WHO Codex Alimentarius Commission continued to mention these methods in its documents and recommendations. Since the XXVI IUPAC Conference, six more standard methods had been prepared in final text for publication by IUPAC. Currently, seven other methods and characterizations constituted the work programme. It was planned to discuss these activities and establish the working programme for 1972-73 at a meeting in Chester during September 1972. Long range objectives of the Section should be stressed. Some methods could be studied and standardized in a relatively short period, whereas others like the determination of chlorinated pesticides in oils and fats required more time. These latter methods were an important part of present-day problems being studied by a sub-committee of the Section.

### **Section VI.4: Air Quality**

Approved methods for iron oxide fume, mercaptans, and antimony were being edited for publication. The methods in question had been through the collaborative test procedure of the American Conference of Governmental Hygienists. Atomic absorption spectroscopy methods for a group of airborne metallic contaminants had been developed on behalf of SCOPE. Of these, the procedure for beryllium, cadmium, lead, and vanadium had now been circulated to Members for comment.

Hydrogen chloride vapour in air, total trichlor compounds in urine, and performance standards for detector tubes had been through the final write-up. Approved methods for phenol, amines, cholinesterase, methyl bromide, and isocyanates were being rewritten.

### **Section VI.5: Pesticides**

The Section had continued its close association with FAO, WHO, Codex Committee on Pesticide Residues, OECD, CEE, and the Joint FAO/IAEA



programme. Plans were proceeding for organization of the III International Congress of Pesticide Chemistry, sponsored by IUPAC, due to be held in Helsinki in July 1974. The problems considered by Commission VI.5.2 (Pesticide Residue Analysis) stemmed from the requirements of FAO/WHO and their solution would be of use to the FAO/WHO Codex Alimentarius Commission through its Committee on Pesticide Residues. Plans were to continue to survey compounds for which further analytical information was required by FAO/WHO, such as organochlorine and organophosphorus compounds, fumigants, herbicides, organomercurials, dithiocarbamates and other fungicides, and carbamate compounds.

#### **Section VI.6: Organic Coatings**

This Section had continued its efforts to initiate a monograph series on Progress in Organic Coatings as well as its work on analytical methods for alkyd resins and acrylic resins. Procedures for these two materials had been developed and were in the process of being prepared for publication. Experimental work on the analysis of polyurethanes was being pursued.

Considerable discussion had taken place on the future of the Section and several possibilities were still under consideration. The Members intended to continue as an international group working with scientific and technical problems of interest to the coatings field, and were considering either attachment to the IUPAC Macromolecular Division, attachment to associations and federations of organic coatings chemists, or independent existence.

#### **Section VI.7: Water Quality**

The Section had met in Brixham during March 1972. A programme had been developed for its joint symposium at the XXIV IUPAC Congress (1973) in Hamburg, entitled Modern Methods for Treatment of Waste Water in Theory and Practice. The Section was working on developing a programme for a study on Water and the Waste Water Recovery, Reclamation and Recycle in Different Types of Industry. It was also making efforts to broaden its cooperation with IAWPR. The Section was participating in the work of the COWAR Committee of ICSU and following closely the work relevant to water quality within OECD and ISO.

R. W. CAIRNS

### **CLINICAL CHEMISTRY SECTION**

Meetings of the three Commissions were called for the week preceding the VIII International Congress on Clinical Chemistry held in Copenhagen during June 1972. IUPAC funds for travel and subsistence being quite limited this year, the Chairman of the Section had spent considerable time in corresponding with Commission Members to ascertain if they could obtain funds from other sources for the Copenhagen meetings. The final outcome was that a considerable part of the \$3,000 allocated to the Section for 1972 was not spent and could be transferred to the following year.

When it became evident that many of the Section's Titular Members, including the Chairman and Secretary, would be in Copenhagen for the Congress, and also quite a number of National Representatives would attend, it was decided to call a short meeting of the full Section. At that meeting and at a private meeting held between Members of the *ad hoc* Committee on Clinical Toxicology and other interested persons, particularly

Prof. F. W. SUNDERMAN, the question of establishing within IUPAC a Commission on Clinical Toxicology was considered. It was agreed that this would be a useful activity for the Section to undertake.

Several Section Members participated personally in the VIII International Congress of Clinical Chemistry and also in many of the associated activities of IFCC. The Congress was sponsored by IUPAC, which was represented at the opening ceremonies by the Section Chairman. The Chairman and Secretary of the Section also attended, as official IUPAC delegates, the Executive Council and the General Council meetings of IFCC.

### **Commission on Automation**

Draft reports entitled 'Glossary of Terms used in Automatic Analysis' and 'Recommendations concerning Automated Analysis in Clinical Chemistry' had been produced and would be discussed with the Commission on Nomenclature of the Analytical Chemistry Division at the XXVII IUPAC Conference (1973). Two related subjects were to be considered by the Commission: evaluation of automatic laboratory equipment and concepts of electronic data processing in clinical chemistry.

### **Commission on Quantities and Units**

Publication, jointly with IFCC, had taken place in February 1972 of 'Quantities and Units in Clinical Chemistry' and 'List of Quantities in Clinical Chemistry', as Tentative Nomenclature Appendices Nos. 20 and 21 to the *Information Bulletin*. The Commission was examining manuscripts on new units and on nomenclature in clinical spectroscopy.

### **Commission on Teaching**

The text of the 'Manual on Teaching of Clinical Chemistry' was being edited for submission to the Section Committee and its National Representatives before the end of 1972. After receipt of comments, it was hoped to proceed to publication in 1973.

D. B. TONKS

## REPORTS OF IUPAC BODIES

### SECTION ON FERMENTATION INDUSTRIES (VI.2)

Kyoto, 20-24 March 1972

*Present:* Dr. A. F. LANGLYKKE (Chairman), Dr. S. KINOSHITA (Vice-Chairman), Dr. J. C. HOOPERHEIDE (Secretary), Prof. A. FIECHTER, Dr. I. HORVÁTH, Prof. S. J. PIRT (Titular Members); Mr. W. K. BRONN, Dr. F. PARISI, Prof. H. SUOMALAINEN, Prof. G. TERUI (Associate Members); Dr. J. VAN LANEN (Observer).

#### Minutes of Previous Meeting

The minutes of the previous meeting (see *Comptes Rendus XXVI Conference*, pp. 218-222) were approved without further comment.

#### Election of New Members

Three vacancies existed for Associate Members of the Section. A list of possible candidates was drawn up. Dr. LANGLYKKE would contact these persons, enquiring if they were willing to accept nomination, prior to approval by the Bureau and the respective National Adhering Organizations.

#### V International Fermentation Symposium

A formal invitation had been received by the Section, signed by the Managing and Scientific Directors and the Board of Guardians of Institut für Gärungsgewerbe und Biotechnologie, to organize the next International Fermentation Symposium in Berlin (1976) under IUPAC sponsorship. By vote the Section strongly supported this invitation. It had also been warmly received by the participants at the closing ceremony of the IV Symposium (see *Information Bulletin* Nos. 42/43, July 1972, pp. 51-52). The Section proposed to act as an intermediary for obtaining continued IUPAC sponsorship for this series of highly important Symposia.

#### VI International Fermentation Symposium

Dr. K. S. GOPALKRISHNAN of the Antibiotic Research Centre at Poona, representing the Association of Microbiologists of India, was introduced to the Section by Prof. TERUI. He suggested that the VI Symposium might be held in Bombay or New Delhi (1980). It was decided to give the invitation serious consideration in due course.

#### International Symposium on Advances in Microbial Engineering

Dr. HOOPERHEIDE had been appointed the official representative of IUPAC at the Symposium (Mariánské Lázně, 28 August-1 September 1972). He would organize a panel discussion on SCP.

#### Education in Bioengineering

The Project Group charged with developing a curriculum presented a formulation of minimal requirements for a biochemical engineering curriculum. This proposal was elaborated on the basis of results of an enquiry directed to experts around the world. A final recommendation, provided with com-



ments, would be worked out and presented for approval by the Section at its next meeting.

### **Directory of Research Laboratories in Field of Fermentation**

All Members of the Section present at the meeting volunteered to prepare lists of fermentation laboratories for countries with which they were familiar and which had not yet been covered. Butterworths was definitely not interested in publishing such a Directory. Attempts were therefore being made to find a publisher willing to edit and publish such a Directory with the full cooperation of the Section, but with no financial involvement for IUPAC.

### **Standards for Protein of Microbial Origin (SCP)**

The Group charged with this project submitted a preliminary report dealing with specifications for its use as ingredient for animal feed, particularly adapted for SCP produced from alcanes. Extensive tests for safety and nutritional quality of such novel proteins were recommended as future guidelines before such products could be admitted as a major protein source for animal feed. In addition, tentative standards of identity were proposed, aimed at a guarantee of reproducible quality.

During the past year Dr. HOGERHEIDE had attended the Moscow meeting of the PAG *ad hoc* Committee set up by FAO/WHO/UNICEF for similar purposes, for an exchange of viewpoints. In addition, he had participated in a symposium at Aix en Provence, organized by British Petroleum, at which an excellent review was presented on the industrial achievement in production of safe SCP products of high quality destined for animal feed ingredients.

It was decided that the proposed guidelines be discussed with members of the PAG *ad hoc* Committee. Also, the guidelines would be submitted to the Food Section for advice and comment, particularly on analytical problems connected with the proposed standards of identity. It was expected that a final report could be submitted to the Section at its next meeting for approval prior to publication. The next step, thereafter, would be recommending modifications aimed at the utility of such SCP products as ingredients for *human* consumption.

### **Cooperation with International Association for Cereal Chemistry (ICC)**

Up to the present there had been cooperation of the Section with Working Group 30 of ICC for the purpose of establishing standard methods for determining fermentation power of active dry baker's yeast. Insufficient information was available at present to warrant setting up another world-wide comparative test in cooperation with Working Group 30. Cooperation with ICC on other matters relating to food problems, outside the scope of interest of the Fermentation Industries Section, were being investigated by the Food Section.

### **Water Pollution**

The Group was unanimously of the opinion that it should find an opportunity for a general discussion within IUPAC on microbiological aspects of effluent purification. Particularly in the fermentation industries, this problem was becoming even more pressing and difficult to solve. There was a need

to make much more rapid progress in this area and the Group felt that the microbiology of effluent purification was probably a major limiting factor in process development. Prof. PIRT was asked to investigate if such a discussion could be organized during the XXIV IUPAC Congress (Hamburg, 1973), possibly in cooperation with the Water Quality Section. The latter was sponsoring a joint symposium under the title 'Modern Methods for Treatment of Waste Water in Theory and Practice' at the Congress.

J. C. HOOGERHEIDE

## SECTION ON WATER QUALITY (VI.7)

Brixham, 29 March 1972

*Present:* Dr. S. FREYSCHUSS (Chairman), Mr. B. GÖRANSSON (Secretary), Dr. P. N. J. CHIPPERFIELD, Dr. P. DALCQ, Dr. K. TROBISCH (Titular Members).

1. Reports on the activities of OECD within the field of water quality were given by Drs. FREYSCHUSS and DALCQ.

The joint *ad hoc* Group on Pollution by the Pulp and Paper Industry would finish its work this year and the final report should be ready in September. The most interesting parts would probably be those dealing with 'Advanced Abatement Technology', which would cover technology likely to be employed during the twentieth century, and 'Economic and Financial Aspects'. For many countries the relative cost for water pollution abatement at mills producing common qualities was today around 2 US\$ per ton of pulp. In some cases this cost would probably rise to 7-8 US\$ per ton within the next ten years.

Under the Steering Group on Eutrophication there were four working Groups active at present:

- (i) on fertilizers and waste products from agriculture
- (ii) on treatment processes for elimination of phosphorus and nitrogen
- (iii) on detergents
- (iv) on monitoring and measuring techniques

The Group on treatment processes had produced a draft report on all available treatment processes. Phosphorus could quite easily be removed to an extent of 80-95% with presently employed treatment processes. The Group on detergents was discussing whether NTA was the only feasible substitute for polyphosphate in detergents. A majority of the members was against NTA.

2. A definite programme was established for the joint symposium at the XXIV IUPAC Congress (Hamburg, 1973), entitled 'Modern Methods for Treatment of Waste Water in Theory and Practice'.

### *First day*

#### 1st Session

- I *Flocculation Processes and Use of Precipitation and Sludge Dewatering Aids*  
Main speaker: Dr. J. C. BOEGLIN (Institute de Recherches Hydrologique de Nancy, France)

#### 2nd Session

- II *Combined Chemical-Biological Treatment Systems*

Main speaker: Dr. H. O. BOUVENG (Institut för Vatten- och Luftvårdsforskning, Stockholm, Sweden)

## *Second day*

### 1st Session

#### III *Adsorption Processes, especially Use of Activated Carbon*

Main speaker: Prof. W. J. WEBER, JR. (University of Michigan, Ann Arbor, USA)

### 2nd Session

#### IV *Ion Exchange and Membrane Processes*

Main speaker: Ion Exchange Processes: Dr. CHR. OEHME (Farbenfabrik Bayer AG, Leverkusen, Germany)

Main speaker: Membrane Processes: Dr. D. C. SAMMON (Atomic Energy Research Establishment, Harwell, UK)

All sessions should be plenary, and an invitation for the submission of discussion papers distributed along with the symposium programme.

For evaluation of the discussion papers, the following groups were formed:

Subjects I and II: Drs. TROBISCH and DALCQ

Subject III : Dr. FREYSCHUSS and Prof. PEARSON

Subject IV : Drs. CHIPPERFIELD and GRAU

Dr. TROBISCH was appointed Symposium Editor.

3. The relative harmfulness of different substances in waste water was discussed. The Section agreed on the following statement:

'In national legislation and international agreements, rules about restriction of effluent discharge to receiving water, including the disposal of liquid waste from vessels to the sea, ought to be based on scientifically verified facts.'

This was far from always the case.

Special attention should be devoted to substances well documented to have high acute toxicity in frequently occurring concentrations, or to be hazardous to aquatic life and man through longterm effects, and to substances which scientifically based facts justified suspicion about such effects.

4. The Section discussed the carrying out of a study on Water and Waste Water Recovery, Reclamation and Recycle in Different Types of Industry. The study should include a number of casestudies made in industries which were advanced in this respect. The aim was to demonstrate the possibilities and advantages that could be reached by recovery, reclamation, and recycle of water and waste water.

5. Dr. FREYSCHUSS reported that Dr. PER-OLOF BETHGE (Svenska Träforskningsinstitutet) would represent IUPAC as an Observer at the first meeting of ISO/TC 147 (Water Purity), in Geneva on 25-26 April 1972.

6. On a suggestion from Dr. DALCQ the Section decided that IAWPR should be approached with a request that the initiated cooperation between the two bodies should be further developed.

B. GÖRANSSON

## **COMMITTEE ON PUBLICATIONS**

**London, 21 April 1972**

*Present:* Prof. Sir HAROLD THOMPSON (Chairman), Dr. L. C. CROSS, Dr. H. GRÜNEWALD, Dr. R. L. KENYON, Prof. B. C. L. WEEDON (Scientific Editor).  
*In attendance:* Prof. C. F. CULLIS (Assistant Scientific Editor), Dr. M. WILLIAMS, Mr. E. R. NORTON (Messrs. Butterworths).



## Minutes of Previous Meeting and Matters Arising

The minutes of the previous meeting (see *Comptes Rendus XXVI Conference*, pp. 72-75) were accepted.

Sir HAROLD THOMPSON reported that his revised version of the earlier pamphlet *IUPAC—What it is—What it does—How it works—How it is financed* had been considered recently by the Executive Committee. After members of the Executive Committee had submitted comments on the manuscript, it was to be distributed by the Secretariat for publication in full or in abbreviated form in national chemical journals. In addition, there was to be a brochure to assist in extension of the IUPAC Company Associates Scheme. It would be produced utilizing professional advice and summarize IUPAC activities particularly relevant to the effective application of chemistry throughout industry.

## Information Bulletin and Its Appendices

(i) *Review of Status and Subscription for 1973.* Paid subscribers to the Bulletin and its Appendices were growing steadily. Data showed that the present subscription rates did not cover costs of production and postage. Doubts were expressed that requests for Appendices alone should continue to be handled free of charge, and the possibility of charging separately from the Bulletin subscription for each Appendix was discussed.

It was *Resolved*:

- (i) to recommend to the Bureau (Executive Committee) that the subscription (surface postage) to the Bulletin and its Appendices in 1973 be raised to \$9.00 (£3.00); the corresponding rate for air postage of the Bulletin would be \$12.00 (£4.00);
- (ii) to await the availability of a detailed income-expenditure account for IUPAC publications before deciding about the introduction of a separate charge for the Appendices.
- (ii) *Laysheets.* Special laysheets were now available from the Secretariat. Brief instructions had been issued for preparation of manuscripts in a form suitable for publication as Appendices to the Bulletin.

## Scheme for IUPAC News in National Chemical Journals

Important items of IUPAC news were now being disseminated by the Secretariat to national chemical news journals in 21 countries. It was decided that the scheme should be evaluated after operating for 12 months. A decision could then be taken on extending it to all 44 member countries of the Union and to coverage of both journals of pure and applied chemistry in each country.

## IUPAC-IUB Enzyme Nomenclature Report

Sir HAROLD THOMPSON gave a brief account of the dispute which had arisen between IUPAC and IUB since his suggestion for publication of the new report on Enzyme Nomenclature. In addition to an offer from Butterworths, IUB had obtained quotations from three other publishers. The Committee on Publications recommended that all quotations should be to a uniform specification, agreed between IUPAC and IUB. Only then could a proper evaluation be made by the two Unions.

## **Standing Orders of Executive Committee regarding Committee on Publications**

Draft Standing Orders for the Committee on Publications were considered. The draft was based on approved Standing Orders regarding the Finance Committee. In view of possible major changes in future IUPAC publishing policy, it was thought desirable to retain the foundation Membership for the next few years.

The present situation whereby the Chairman of the Editorial Advisory Board of *Pure and Applied Chemistry* was also Chairman of the Committee on Publications, might not continue. It was *Resolved* to recommend to the Bureau (Executive Committee) that:

- (i) the Chairman of the Committee on Publications and not the Chairman of the Editorial Advisory Board should be an ex-officio Member of the Bureau.
- (ii) the Committee on Publications and not the Bureau should constitute the Advisory Board.

## **International Book Year 1972**

The principal international nongovernmental organizations of the book world, on the occasion of International Book Year 1972, had approved a Charter of the Book. It set out the principles which these organizations believed should apply to books so as to enable them to play their full role in society. These organizations, in association with UNESCO, had invited other international as well as regional and national organizations to associate themselves with the Charter. The Committee recommended to the President that IUPAC should support the Charter of the Book.

## **Proposed Project on Solubility Data**

It was reported that the Commission on Equilibrium Data was considering a project aimed at generating volumes of compiled and critically evaluated solubility data on all physical systems, uniformly edited and published. A suggestion had been made that individual compilers should receive financial support for their work.

The Committee on Publications decided that the solubility data series was beyond the scope of the present IUPAC publishing programme. CODATA was probably better suited to handle it, although IUPAC might be able to collaborate in some of the work.

## **Matters arising with Butterworths**

(i) *Renewal of Contract*. The Third Supplemental Agreement to the 1960 Revised Principal Agreement continued the appointment of Butterworths as official publisher to IUPAC for 3 years from 1 July 1969. Termination was by 6 months notice from either side at any time. In view of possible major changes in future publishing policy of the Union, the Committee on Publications thought it desirable only to extend the appointment for one year at a time from 1 July 1972.

(ii) *Price and Frequency of PAC in 1973*. Mr. NORTON confirmed that the previous undertaking not to request a rise in subscription to the journal before 1974 would be honoured by Butterworths. The amount of material for publication from IUPAC-sponsored symposia in 1972 indicated that the frequency should remain at 4 volumes per annum for 1973.

(iii) *Supplements to PAC*. Because they had identical covers, difficulty was experienced in distinguishing between hardcover offprints from PAC and material issued as supplements to it. This had led to refusals to review IUPAC publications in some major journals.

Mr. NORTON circulated some alternative cover designs which might be used for the supplements. After a critical appraisal it was decided:

- (i) to discontinue all reference to 'Supplement to Pure and Applied Chemistry';
- (ii) to introduce a special hard cover for all nonsymposium material not previously published in PAC;
- (iii) to replace the clear plastic wrapper by a paper wrapper for symposium material not previously published in PAC, otherwise to retain the same green hard cover as for offprints;
- (iv) to relegate from all front covers to interior title pages all nonessential wording, thereby enabling emphasis to be placed on the main subject title.

Mr. NORTON agreed to produce the necessary dummies for comment by the Committee on Publications.

(iv) *Symposia with Few Main Lectures*. Sir HAROLD THOMPSON expressed concern at the number of IUPAC-sponsored symposia with only 3 or 4 plenary lectures. Although this material was often suitable for publication in PAC, the offprints were not viable. For a trial period of one year, the Committee on Publications agreed to have no offprint for a symposium unless it exceeded 50 printed pages of the journal.

(v) *Distribution in USA*. Mr. NORTON gave brief details of arrangements recently concluded by Butterworths with Crane, Russak & Co. Inc. (New York) for distribution of IUPAC publications in North America.

(vi) *Status of Publications Programme*. Prof. WEEDON reported that only a single issue from the 4 volumes of PAC scheduled for 1971 had remained outstanding at the end of the year; it had been cleared early in 1972. In addition, 8 volumes of main papers from the XXIII IUPAC Congress had been published within 3 months of the meeting and a number of other supplements had been produced during 1971. For 1972 one volume had been issued to date and sufficient material was already being processed to complete the allocated 4 volumes within the year; several supplements were again being handled. This was a tribute to the sterling work of Mr. BRIGGS and his colleagues at Butterworths.

(vii) *IUPAC-IUFoST Symposium 1973*. Brief details of the scientific programme arrangements were presented by Prof. WEEDON. The Committee on Publications recommended that IUPAC should offer to publish the 17 invited lectures but not necessarily to take the 12-15 contributed papers. The organizers should be encouraged to collect the invited papers on a form suitable for lithographic printing as for the XXIII IUPAC Congress.

### **Future IUPAC Publishing Policy**

About 120 main lecture manuscripts handed in before the end of the XXIII IUPAC Congress (1971) were published by lithography (photooffset) through Butterworths within 3 months. They were grouped together into 8 volumes of related symposia. The Congress organizers had expressed great satisfaction with the rapid appearance and form of the volumes, and they had been well



reviewed. However, some members of the Committee on Publications criticized this venture.

Widely differing views were expressed regarding the future development of PAC, the *Information Bulletin* and its Appendices, and *Comptes Rendus* of the biennial IUPAC Conferences. It was decided by the Committee to put an objective summary of the various points of view for consideration by the Bureau at its forthcoming meeting in Strasbourg (24-25 September 1972).

### **Any Other Business**

(i) *Permission to Reproduce from IUPAC Publications.* Whilst permission to reproduce parts of articles from IUPAC publications was usually granted, Sir HAROLD THOMPSON was opposed to republication of a whole article in the same language. The Committee on Publications supported this view.

(ii) *Report from Assistant Secretary re. Audiotape.* Consideration of this subject had been deferred at the previous meeting of the Committee on Publications, pending trials with audiotape at meetings of the American Chemical Society. Dr. KENYON said that, overall, the ACS cassette programme was still too new to provide a basis for drawing conclusions with confidence. His present view was, however, that it would be successful and within a year or two would become a standard unit of communication for certain types of programme of the chemical community. The Committee decided to watch the developments within ACS with care and to discuss the matter more fully at a future meeting.

(iii) *IV International Symposium on Photochemistry.* Mr. NORTON was questioned whether Butterworths could see objections to producing one (or more) issue of PAC by offset in 1973: the Committee on Publications had no concern on aesthetic grounds. There appeared to be no difficulties since the journal was now filmset and printed lithographically. The wish of the organizers of the IV International Symposium on Photochemistry for rapid publication of the plenary lectures by offset could therefore be met.

M. WILLIAMS

## **COMMISSION ON ANALYTICAL REACTIONS AND REAGENTS (V.I)**

**Paris, 8 May 1972**

*Present:* Prof. R. BELCHER (Chairman), Prof. F. PELLERIN (Secretary), Dr. J. BARTOS, Dr. A. HULANICKI, Dr. M. KAPEL, Prof. S. SIGGIA, Prof. H. WEISZ (Titular Members); Dr. M. HARMELIN, Prof. J. INCZÉDY, Dr. M. PESEZ (Associate Members).

Prof. BELCHER, in his introductory remarks, mentioned some recent developments in IUPAC matters: administration, financial situation, XXVII IUPAC Conference in 1973. The minutes of the meeting in Washington had been published (*Comptes Rendus XXVI Conference*, pp. 175-176); there were no comments.

### **Study of Report on Amines**

Prof. PELLERIN presented a summary of the comments which had been made on the report by the following Members of the Commission: BELCHER, BARTOS, HARMELIN, HULANICKI, INCZÉDY, PAPOFF, PESEZ, REIDINGER,

SOMMER, WEISZ. All the comments stressed the value of the work documented in the report and the necessity for publication. Prof. BELCHER, on behalf of the Members of the Commission, congratulated the author, Prof. SIGGIA, on the excellence of his report.

Drs. PESEZ and BARTOS presented addenda to the Siggia report on the colorimetry and fluorimetry of amines. Prof. PELLERIN presented an addendum on the use of semimicro titrimetry in heterogeneous media, which might be conveniently applied to the determination of small quantities of amines in various mixtures. These addenda would be attached to the report subject to the following conditions:

- (i) additions to be sent by Prof. PELLERIN to the IUPAC Secretariat for translation into English in September 1972
- (ii) circulation to Members in October 1972
- (iii) comments to be sent to Prof. PELLERIN in January 1973
- (iv) final form to be decided by March 1973
- (v) acceptance at the XXVII IUPAC Conference

Two possibilities were suggested for publication:

- (i) the complete report in the Technical Report series of appendices (blue booklets) to the *Information Bulletin*.
- (ii) if (i) proved to be too expensive, in a more concise form, i.e., principles of the methods, references, and summary of application.

Methods of detection of amines by gas chromatography were not considered. They did not depend on a chemical reaction and it was not possible to present a general method.

### Report on Phenols

The phenols report, submitted by Prof. PELLERIN and Dr. BARTOS, had been approved at the previous meeting. Dr. BARTOS indicated some typographical errors. Prof. PELLERIN would send the final text to Prof. BELCHER. This report of the Commission might also best be published in the Technical Reports series.

### New Work Programmes

The general work of the Commission, as distinct from that in cooperation with the Food Section in fulfillment of the contract with CEE, was discussed:

- (i) The study of organic reactions, such as phenols and amines, which would eventually be of value in compiling methods for CEE. Although not strictly CEE work, it was closely allied to it.
- (ii) There was also the normal work on reagents and reactions and it was essential that work of this kind should continue, even though it be slow. It seemed likely that the CEE contract work would go on for some years and this made it all the more essential that the normal work be kept moving. In particular, the necessity to study the selectivity of reactions and problems connected with redox indicators were stressed. Moreover, for some years the purity of chemicals and the recommendation of standard substances had been taken over by the Commission on Analytical Nomenclature. The latter Commission had rightly asked that this work be transferred back to the Commission on Analytical Reactions.

Prof. BELCHER recommended that this work should be undertaken by a

special Project Group. The Members of this Project Group would, of course, still be concerned with the CEE work but they would simultaneously attempt to keep other activities on the move. A Project Group was appointed consisting of: HULANICKI (Secretary), IKEDA, SOMMER, WEISZ. Dr. HULANICKI presented his first report on redox indicators. This would be circulated next month to Members of the Commission who would then send their comments to the author. Views would be exchanged on this subject.

Projects to be discussed at the 1973 meeting of the Commission would be as follows:

- (i) study of indicators for metals in compleximetry (EDTA) (HULANICKI)
- (ii) development of the work on redox indicators (HULANICKI)
- (iii) study of indicators for acid-base titrations in nonaqueous solvents

### **CEE Contract**

- (i) Two methods would have to be revised editorially:
  - determination of trace metals in food colours by X-ray fluorescence (16/68)
  - determination of mercury content of food additives (11/68)

Dr. KAPEL was going to revise the texts with Dr. COLLINGS of the Food Section, then send them to Prof. PELLERIN for transmission through the usual channels.

- (ii) Method for determination of benzidine, aminodiphenyl,  $\beta$ -naphthylamine (20/68) rejected in Washington: new recommendations were necessary.
- (iii) CEE desired atomic absorption methods for detection of lead, copper, and mercury in food additives. Prof. PELLERIN asked the Members of the Commission to send their proposals to him and he would pass them to Prof. TRUHAUT and Dr. EGAN for examination.
- (iv) The difficult problem of detection of traces of selenium in food colours was raised. Prof. PELLERIN and Dr. PESEZ stressed the difficulties relating to mineralization and identification. Prof. WEISZ proposed to undertake an investigation into these matters.

### **Study of Organic Reactions**

Members of the Commission were invited to consider several possible new projects, policy on which should be decided at the next meeting:

- (i) sulphur and halogen containing compounds—it was agreed to seek the advice of the Section on Pesticides
- (ii) carbonyl groups (aldehydes and ketones) (PESEZ, BARTOS, PELLERIN)
- (iii) identification, differentiation, and determination of steroids: selection of current methods (PESEZ, BARTOS)

### **ISO Methods**

Prof. BELCHER referred to a request that the Commission should pass comment on analytical methods proposed by various ISO Technical Committees. The Commission agreed to undertake this task.

Prof. BELCHER would himself circulate the first batch of ISO methods and ask for comments to be sent to him direct:

- (i) ISO/DIS 2762: Hydrochloric acid for industrial use: determination of soluble sulfates—turbidimetric method
- (ii) ISO/DIS 2760: Crude sodium borates for industrial use: determina-



- tion of total aluminium content—volumetric method
- (iii) ISO/DIS 2717: Sulfuric acid and oleum for industrial use: determination of lead content—dithizone photometric method
  - (iv) ISO 1904-1972 (E): Liquefied phenol for industrial use—determination of phenols content—bromination method

Future ISO methods would be distributed to the Commission Members via the IUPAC Secretariat.

F. PELLERIN

## COMMISSION ON PHYSICOCHEMICAL MEASUREMENTS AND STANDARDS (I.4)

Zeist, 9-10 June 1972

The meeting was restricted to the Commission's Task Group on Standard Calibration Substances with representatives from some other Commissions of the Physical Chemistry Division.

*Present:* Prof. H. KIENITZ (Chairman), Dr. D. AMBROSE (Secretary), Dr. J. P. CALI, Prof. H. FEUERBERG, Dr. T. PLEBANSKI, Dr. W. M. SMIT (Commission I.4); Dr. J. D. COX (Commission I.2); Prof. G. MILAZZO (Commission I.3); Dr. E. BRUNNER, Prof. W. THOMAS (Observers).

I. A major activity of the Commission in recent years had culminated with the publication of 'Catalogue of Physicochemical Standard Substances' [*Pure Appl. Chem.*, **29** (4), 597 (1972)]. While this work had been in progress, the need for a much larger and more comprehensive catalog was realized. This led to the appointment of a Task Group on Standard Calibration Substances, whose first meeting was held in 1970 (see *Information Bulletin* No. 38, November 1970, pp. 25-27).

A draft Introductory Chapter had been written by Dr. CALI for the proposed 'Catalogue of IUPAC Recommended Calibration and Test Materials for the Realization of Physicochemical Properties'. It had been circulated to several people and some written comments had been received (ANGUS, COX, FEUERBERG, GRAHAM, KIENITZ, MASHIKO, STULL, TERRIEN). In discussion the following points were made.

With regard to the suggestion that the Chapter was too long, if the historical section was relegated to an appendix no further reduction in length might be necessary. The definitions should not be philosophical but should be operational explanations. The Group was not a nomenclature body, and should not devote excessive effort to definitions now because they could always be amended later if necessary. However, it was desirable to distinguish between calibration and test materials, and there was also the question whether, in a water triple-point cell, the water alone was a reference material because it was the whole device of material and cell which provided the reference; similarly, the form of a glass prism was an essential in its use as a refractive index standard.

It was agreed that Dr. CALI should rewrite the Chapter taking account of all the suggestions made. Further comments should be as specific as possible and sent to Dr. CALI by 30 September, so that a revised draft could be circulated by the end of the year. The revised draft would include a statement that the work was of a continuing nature and that the initial recommendations would be revised and extended.

II. For preliminary publication it was agreed that each section of the

recommendations should consist of an introduction followed by the details for each material (one sheet for each material with, for the present, no change in format from that used currently for assembling the recommendations).

Against the desirability that the introduction should be critical and specify requirements for the correct use of the materials recommended, had to be balanced the fact that, in some instances, this would involve writing a book on the relevant techniques. If a supplier of a material was mentioned, then the full address of the supplier should be given. There were problems in naming commercial firms unless independent testing could be carried out, as was done for the European Pharmacopoeia. However, standards for a pharmacopoeia served a different function from recommendations made by the present Group, which were not intended ever to have legal standing; the Group would not recommend any firm, but merely state that in some particular tests, material from a stated source proved suitable. An alternative approach would be to give a specification in terms of purity so that the naming of suppliers would be unnecessary and, in theory, the user could prepare a sample himself. However, several Members of the Group foresaw difficulties in producing correct specifications because the requirements, in terms of purity, *etc.*, were seldom known sufficiently exactly. It was agreed that there was no problem in naming national laboratories as suppliers, but that the Secretary should seek a ruling on IUPAC policy about the naming of commercial suppliers.

Reports on the work of each of the 12 teams were presented by the person named in parentheses. [The composition of the team agreed at the meeting to continue the work is given at the end of each section (team captain given first).]

1. *Density* (AMBROSE)

Dr. AMBROSE had agreed to deal with mercury. Gaps in the proposed coverage were named, *viz.* liquefied gases down to  $-50^{\circ}\text{C}$ , liquids under pressure up to  $200^{\circ}\text{C}$ , densities in the range  $2000$  to  $4000\text{ kg m}^{-3}$ , solids. There might be lack of suitable materials or data, and this raised the general question of the balance between what was desirable and what was possible if any recommendations were to be ready within one or two years. It was agreed that the attention of team captains should be drawn to the gaps with the request that they filled them if possible. A point specific to the work of this team was the need to differentiate between primary standards (water and mercury) and secondary standards. For the latter, densities should not be given to the highest precision because the exact value applied only to a particular certified sample.

BROWN, AMBROSE, CALI, PLEBANSKI

2. *Viscosity* (SMIT)

It was difficult to make recommendations of reference materials for the viscosities of gases. While viscosity standards for temperatures up to  $140^{\circ}\text{C}$  were needed, in the plastics industry for example, the need was for standards for reproducibility rather than absolute values.

SMIT, PLEBANSKI, THOMAS

3. *Surface Tension* (no report)

It was agreed that the Secretary should write to the team captain to enquire whether there had been any progress and, if not, to suggest combination of team 3 with 1, *i.e.*, to restrict consideration of surface tension to its effect in density measurement. The Chairman would

enquire about the importance of surface tension to industry.

BROWN, FRANC, PLEBANSKI

4. *PVT Properties and Phase Equilibria of Single-component Systems* (AMBROSE)

Guidance was given about the coverage needed, viz. vapour pressures, PVT of supercritical gases, densities of coexisting liquid and vapour phases.

AMBROSE, ANGUS, THOMAS

5. *Calorimetry* (COX)

This section of the recommendations was before the meeting as a report ready for consideration by the parent Commission at its meeting in 1973. The meeting congratulated Dr. COX on his achievement.

COX, CALI

6. *Thermal Conductivity* (BRUNNER)

The desirability of making any recommendations for gases was questioned because of uncertainties in the methods of measuring this property. Dr. COX would make contact with Dr. H. ZIEBLAND and invite his cooperation in this work.

BRUNNER, CALI, THOMAS

7. *Distillation Column Performance* (BRUNNER)

Details of fifteen systems, some of which were adopted from the proposals of the European Federation of Chemical Engineering, would be included. It was agreed that this team should extend its work to liquid extraction and gas absorption if possible, and that the relationship of the work to that of the other teams (i.e., that it dealt with a process rather than a physical property) should be discussed at the next meeting of the parent Commission.

KIENITZ, BROWN, BRUNNER, SMIT

8. *Optical Properties* (FEUERBERG)

Dr. CALI would provide information on NBS wavelength standards. The relative merits of solid reference materials and solutions were discussed, and it was pointed out that although in some instances the former might be preferable to the latter (e.g., in polarimetry quartz plates were more satisfactory than sugar solutions) and that in general the solid reference materials were more accurate, nevertheless both types were needed because, to give one reason, solutions were effective over a wider range of frequencies than were glass filters. In the work of this team account would have to be taken of the interests of other international bodies such as the International Commission on Light. The variety of properties suggested that the team would be well advised to split its work into smaller sections. The possibility that Prof. FEUERBERG might take over the captaincy from Dr. BROWN was discussed.

BROWN, FEUERBERG, FRANC, MASHIKO, MILAZZO, PLEBANSKI

9. *Dielectric Constants, Permittivity* (KIENITZ)

A draft paper was presented to the meeting, which Dr. COX undertook to have scrutinized by the appropriate experts in NPL. It was commented that descriptions of the preparation of the materials were insufficiently detailed.

KIENITZ, CALI, COX

10. *Potentiometric Ion Activities* (CALI)

International agreement was needed about the pH scale and at present



it had to be accepted that there were three separate scales, viz. those of USA, of UK, and of Japan.

CALI, MILAZZO, SIMON

11. *Temperature Test Materials* (SMIT)

In discussion the following points were made. Apparatuses for thermal analysis and melting-point determination could not be calibrated by use of triple-point cells, and recommendations were needed for these methods. In differential scanning calorimetry the experimenter wished to combine the checks on temperature and energy; there was, therefore, need for coordination between teams 5 and 11. The secondary reference points of IPTS-68 should be included. Zone melting sometimes concentrated high-melting impurities and yielded a sample with too high a melting point; a reference material for melting points should therefore be taken from a sample for which the value had been actually measured. It was preferable for users to check mercury-in-glass thermometers themselves with the aid of reference materials, rather than to rely on calibration elsewhere.

SMIT, CALI, KIENITZ, MILAZZO, THOMAS

12. *Molecular Weight* (deferred to next meeting of parent Commission)

It was pointed out that if this work related to polymers the team should be in contact with the Macromolecular Division. Dr. SMIT undertook to write to Prof. SIMON about the matter.

SIMON, SMIT

III. Prof. MILAZZO gave accounts of the work of Istituto superiore di Sanita di Roma on spectrophotometry, refractometry, ion activities, and melting points during the discussion of the work of teams 8, 10, and 11.

IV. It was agreed to set a target date of 15 December 1972 for submission to the Chairman of the team reports, with the introductory chapters, which could be reproduced by the end of January 1973 for circulation before the 1973 meeting of the parent Commission. The reports would be distributed in the first instance only to Members of the Commission, its Task Group, and the President of the Physical Chemistry Division; any wider distribution would be decided later.

V. It was agreed that no fresh tasks should be started yet. The work of team 10 might eventually be broadened so that its title became 'Electrochemical Quantities'. The preparation of standards for electrical conductivity and humidity was being undertaken in Poland. It would be desirable to have a French member of the Task Group. BIPM was beginning to assemble information on sources of supply of, and specifications for, reference materials for realization of the base units of SI. Euratom was conducting a survey of needs for standard reference materials.

VI. It was resolved that Dr. BRUNNER, Prof. MILAZZO, and Prof. THOMAS, who attended this meeting by invitation, should now be invited to become members of the Task Group and join the teams as indicated under II.

D. AMBROSE

## SECTION ON ORGANIC COATINGS (OCS—VI.6)

Florence, 16 June 1972

*Present:* Mr. P. H. FINK-JENSEN (Chairman), Mr. A. TOUSSAINT (Secretary), Dr. L. A. O'NEILL, Dr. U. ZORLL (Titular Members); Mr. M. A. GLASER, Prof. K. HAMANN, Dr. K. M. OESTERLE, Mr. H. K. RAASCHOU NIELSEN, Dr. D. WAPLER (Associate Members); Dr. J. PETIT, Dr. H. SPOOR, Dr. H. W. TALEN (National Representatives); Dr. R. BULT (Observer). By special invitation—Mr. A. O. BRANTSÄTER (President, Federation of Scandinavian Paint and Varnish Technologists: SLF), Dr. M. BONO (President, Fédération d'Associations de Techniciens des Industries des Peintures, Vernis, Emaux et Encres d'Imprimerie de l'Europe Continentale: FATIPEC); Mr. J. P. TEAS (President, Federation of Societies for Paint Technology: FSPT); Dr. H. L. GERHART (FSPT Liaison Committee).

The meeting was an informal session of the Section arranged during the course of the 1972 FATIPEC Congress. It was opened by Mr. FINK-JENSEN with a short summary of the various activities of the Section (cf. *Information Bulletin* Nos. 42/43, July 1972, pp. 13-17).

The contemplated symposium on pollution was discussed and there was general agreement that under the present circumstances the symposium would have to be postponed—even though the subject was a very topical one—until the future of OCS had been clarified. Mr. TEAS underlined the seriousness of the problem in USA, especially the recent lead regulation of the Food and Drug Administration, and mentioned the joint efforts of the Associations of the Manufacturers, the Dealers, the Contractors and the technical people in protesting against the regulation. Furthermore, he offered to forward relevant FSPT material on this subject to Members of OCS.

The Chairman reported that he had received an ISO document via the IUPAC Secretariat, with the request that OCS might prepare comments. There was general agreement that because several Members of OCS were simultaneously members of various ISO Technical Committees, the requested preparation of comments would be an unnecessary duplication of effort. Finally, Mr. FINK-JENSEN indicated that so far he had received no reply to his letter of 23 March 1972 to the President of the Macromolecular Division, Prof. BENOIT. He felt certain, however, that after the meeting of the Macromolecular Division in Helsinki at the beginning of July, where the question of an attachment of OCS to the Macromolecular Division would be discussed, a reply to his letter would be forthcoming.

### Future of Organic Coatings Section

Prior to the present session, a meeting had been arranged on 11 June between Messrs. TEAS, GERHART, BRANTSÄTER, FINK-JENSEN, and RAASCHOU NIELSEN. In addition, the Chairman and Secretary of OCS had contacted the Presidents of FATIPEC and SLF for moral support from the different Federations and viewpoints as to how the organization and functioning of OCS might be after 1973. The basis for the discussions had been that:

- (i) OCS must be an international body;
- (ii) the projects undertaken had to be of international interest and should, if possible, be carried out by representatives of a reasonable large number of member countries;

- (iii) OCS wished to preserve its independence towards the Federations and other organizations, or in other words, whatever solution found, OCS would prefer to continue working as it had done up until now.

The situation and the position of OCS had been explained by Mr. TOUSSAINT to Dr. BONO and Mr. BOURGERY during the assembly of the Scientific Committee of FATIPEC and the assembly of the board of FATIPEC. The Secretary of OCS also raised the question of the support of FATIPEC and possible propositions as a basis for discussion.

During the present meeting, Dr. GERHART gave a short account of the session on 11 June and its results according to which an American proposal—including the OCS as an essential part—would be prepared and circulated. Mr. TEAS confirmed that FSPT was very positive towards international co-operation. Firstly, there were many common international problems, and secondly, it was becoming more and more difficult to have work carried out voluntarily by individual members of FSPT. Mr. TEAS suggested that OCS might attempt to make available extensive information on research projects being carried out by nonproprietary organizations. This would be an extremely valuable enterprise which no other organization could do as well as OCS. Mr. BRANTSÅTER also thought this to be a suitable project for OCS. (The idea had been presented and discussed at an earlier meeting of OCS: see *Information Bulletin* No. 40, June 1971, p. 22.)

On being questioned as to the viewpoint of FATIPEC, Dr. BONO replied that actually Dr. PETIT or Prof. PAGANI would be better qualified to answer this question. He could say, however, that the members of the board of FATIPEC considered OCS to be a valuable organization and that they had asked him to make the following proposition to OCS

‘The Technical and Scientific Committee of FATIPEC is to be enlarged with the European Members of OCS. This Committee will then immediately create a special Commission (a new OCS) which shall be able to work as independently and internationally as OCS does at present. All present and future OCS Members shall enter this Commission.’

This proposition would be forwarded to the Chairman in an official letter, if he so desired. Mr. FINK-JENSEN received the proposal of FATIPEC with satisfaction since it showed that there was an active interest in the continued existence of OCS. As far as SLF was concerned, Mr. BRANTSÅTER could not take an official position, but personally he was in agreement with the Section’s viewpoints on the future of OCS. The question of assistance to OCS would have to be discussed with the individual Scandinavian associations.

A. TOUSSAINT

## **COMMISSION ON AUTOMATION IN CLINICAL CHEMISTRY (CACC)**

**Copenhagen, 14-15 June 1972**

*Present:* Prof. T. P. WHITEHEAD (Chairman), Dr. K. JØRGENSEN, Dr. M. C. SANZ, Dr. D. S. YOUNG (Titular Members).

### **Minutes of Previous Meeting**

The minutes as published in *Information Bulletin* Nos. 42/43 (July 1972, p. 5) were approved and also Dr. JØRGENSEN’s activity report to IUPAC (April 1972).



## Coding of Documents

The following coding was agreed for documents prepared at the present and previous meetings and for some published documents used in discussions:

- CA/1 — Commission on Automation  
'Recommendations concerning Automated Analysis in Clinical Chemistry'  
Copenhagen, June 1972
- CA/2 — Commission on Analytical Nomenclature  
'Recommended Nomenclature for Automatic Analysis'  
*Pure Appl. Chem.*, **21** (4), 527 (1970)
- CA/3 — Commission on Analytical Nomenclature  
'Recommendations for Presentation of Results of Chemical Analysis'  
*Pure Appl. Chem.*, **18** (3), 437 (1969)
- CA/4 — British Medical Association  
'Recommended Scheme for Evaluation of Instruments for Automatic Analysis in the Clinical Biochemistry Laboratory'  
*J. Clin. Path.*, **22**, 278 (1969)
- CA/5 — Commission on Automation  
'Recommendations of Terminology'  
Washington, July 1971
- CA/6 — Commission on Automation  
'Glossary of Terms used in Automatic Analysis'  
Copenhagen, June 1972
- CA/7 — List of Terminology used in Electronic Data Processing  
Prepared by D. S. Young from the American National Standard Vocabulary for Information Processing (1970)
- CA/8 — K. JØRGENSEN's report to IUPAC  
April 1972

Some other documents were discussed briefly but needed further consideration before being added to the above list ['Automation in und mit der Analytischen Chemie III', *Z. Anal. Chem.*, **247**, 1-8 (1969); Sollkonzept zur Automation und Datenverarbeitung der Klinischen Chemie', Deutsche Gesellschaft für Klinische Chemie eV, Mitteilung Nr. 2, April 1972].

## Discussion of Terminology

In the discussions of terminology, some of the recommendations from documents CA/2, CA/3, and CA/5 were combined into a new document designated CA/6. The latter was to be considered preliminary and for discussion in particular with the Commission on Analytical Nomenclature at a joint meeting during the XXVII IUPAC Conference (1973).

## Report on Automated Analysis

Detailed discussions and amendments were made to the text of what in previous minutes was described as 'Report on Automated Analysis'. The resulting document was designated CA/1 and it would also be discussed jointly in due course with the Commission on Analytical Nomenclature. Meanwhile, an agreed format was decided within which alterations were to be made:- (a) Specimen collection, (b) Specimen preparation, (c) Sampling,

(d) Analytical procedure: separation, reaction, and measurement, (e) Results. Each Commission Member would prepare his own amendments and additions for circulation by correspondence before the Spring of 1973.

### Future Activities

Two subjects related to document CA/1 would be considered at future meetings: evaluation of automatic laboratory equipment and concepts of electronic data processing in clinical chemistry.

K. JØRGENSEN

## COMMISSION ON QUANTITIES AND UNITS IN CLINICAL CHEMISTRY (CQUCC)

Copenhagen, 16-17 June 1972

*Present:* Dr. R. DYBKAER (Chairman), Prof. R. HERRMANN, Dr. K. JØRGENSEN, Prof. P. MÉTAIS (Titular Members).

1. The IUPAC body CQUCC was concerned with defining quantities and units in clinical chemistry. Explanation to and adoption of these recommendations, through the IFCC National Associations, by practicing clinical chemists was the responsibility of the Expert Panel on Quantities and Units (EPQU) of the IFCC Committee on Standards. Part of the deliberations in Copenhagen constituted a joint meeting of CQUCC and EPQU. In addition, the Expert Panel on Enzymes of the IFCC Committee on Standards joined in part of the discussions.

2. The minutes of the CQUCC meeting in Washington (*Comptes Rendus XXVI Conference*, pp. 99-101) were reviewed without eliciting any comments.

3. Dr. B. H. ARMBRECHT (not present) had investigated the state of implementation of IUPAC-IFCC Recommendation 1966 *Quantities and Units in Clinical Chemistry* (QU-R66) in several US organizations and reported no real progress.

Dr. DYBKAER stated that the manuscript originally entitled 'Shortened Version of QU-R66' had been corrected in accordance with the Washington decisions and published jointly by IUPAC and IFCC in February 1972 as Tentative Nomenclature Appendix No. 20 to the *Information Bulletin*: 'Quantities and Units in Clinical Chemistry'. The deadline for comments was 31 October 1972. A few letters of comments had been received already and some had been answered. Members had received copies of this correspondence. Likewise, the 'List of Quantities in Clinical Chemistry' was amended and published jointly by IUPAC and IFCC in February 1972 as Tentative Nomenclature Appendix No. 21 to the *Information Bulletin*, with the same deadline. An unfavourable comment on the appearance of the two Appendices and some problems with reading of Greek symbols had been received. There had been a considerable correspondence with international bodies and individuals: giving information, sending reprints, and commenting on problems with quantities and units.

The IUPAC-IFCC Recommendations had now been implemented in the Netherlands, Finland, Denmark (in most departments), and Argentina. German Federal Republic, Sweden, and Switzerland had started the preparations and hoped for conversion in 1973-1974. France had begun the educational process.

Prof. HERRMANN reported that Deutsche Gesellschaft für Klinische Chemie had asked him to translate an English paper on quantities and units into German. The correct translation was difficult, but a draft had been made. Publication was expected to occur late in 1972 and the German Federal Republic aimed at conversion to the new system in 1973. Problems existed in GFR due to the partially divergent activity of Deutscher Normenausschuss in clinical chemistry.

Dr. JØRGENSEN had worked with the practical problems of introducing the system to laboratory sheets and computer printout. Also, he had become a member of an International Committee for Standardization in Haematology Working Party on Quantities and Units (Chairman: Dr. A. H. HOLTZ) that had produced a 17-page document showing the consequences for haematology of adopting the recommendations of IUPAC and IFCC. This document would be discussed by the International Committee for Standardization in Haematology in São Paulo, Washington DC, and Munich in the next few months.

Prof. MÉTAIS had promoted QU-R66 at a symposium in Lyon where discussion was animated. The French paper on quantities and units by Dr. DYBKAER and Prof. MÉTAIS, 'Nomenclature en chimie clinique. Recommandations internationales concernant les quantités, unités et les résultats de laboratoire', had appeared in *Ann. Biol. clin.*, **30**, 99 (1972).

4. The following additional publications from CQUCC were noted:

J. FREI, Fédération internationale de chimie clinique et section de chimie clinique de l'UICPA, *Ther. Umsch.*, **28**, 713 (1971).

P. MÉTAIS, 'Regles de nomenclature en chimie clinique: Les recommandations internationales' in 'Contrôle de Qualité des Examens de Laboratoire'. Journées Nationales de Biologie, Lyon, 5-7 Novembre 1971. Simes-Editions, Villeurbanne, 1972, 37-41.

R. DYBKAER and K. JØRGENSEN, Magnitudes y unidades en química clínica. Incluye la Recomendación 1966 de la Comisión de Química Clínica, de la Unión Internacional de Química Pura y Aplicada y de la Federación Internacional de Química Clínica. EUDEBA, Buenos Aires, 1971, pp. 108 (Spanish translation of QU-R66).

5. Prof. HERMANN had commented on some of the new draft manuscripts for physical kinds of quantities; the remarks were discussed with the following decisions:-

4.40: 'Mean speed' should perhaps be changed to 'Path length mean rate' and it should be explained in the Remarks that 'rate' signified 'divided by time'.

4.40.1: 'travelled by the particle'→'travelled by the centre of gravity of the particle'. In the Remarks it should be explained that the particle might have any size.

4.40.3: 'mean speed(2 s)' was left unchanged as a specification of time for measurement.

4.40.4: 'velocity (linear velocity)'→'velocity (differential linear velocity)' and '(linear) speed'→'(linear) differential speed'.

4.40.5: A Remark should be added: In clinical chemistry the time and path length might be so long that a shorter time or path would alter the resulting mean velocity appreciably.

4.45.1: 'an acceleration'→'an acceleration and/or a deformation'.

4.51.1: 'pascal≡newton per square metre Pa≡N/m<sup>2</sup>'→'pascal Pa'.



4.51.2: Should read: The unit *kilogram metre per square second* or newton per square metre, also called pascal, was equal to ten microbars (exactly).

4.52: 'Viscosity'→'Viscosity (≡absolute viscosity)'. It was decided that the terms of viscosity (v.) were confusing at present and that a more informative nomenclature should be constructed through consultation with specialists in this field. Two main groups were dynamic v. and kinematic v. Each might be absolute, relative, apparent or arbitrary. Shear rate should always be specified unless the system was Newtonian. Or was viscosity restricted to Newtonian fluids? Was viscosity  $\frac{\Delta\tau}{\Delta\sigma}$  or  $\frac{d\tau}{d\sigma}$ ?

4.52.2: 'is equal to'→'is identical with'.

4.54.1: Under Remarks should be added: By the presence of surface active substances in the system the surface tension might vary with time from creation of the surface to the measurement; in such cases the time should be stated. The final decisions on the group 4.50-4.54 should be postponed until the problems of nomenclature in viscosity had been settled.

Prof. HERMANN presented a 4-page draft proposal on 'Nomenclature for Clinical Spectrometry' (Photometry). It was decided that this was a good vocabulary for the formal description of the most important spectrometric kinds of quantities used in clinical chemistry.

A manuscript submitted by Drs. ARMBRECHT and DYBKAER on 'Half-life' was discussed.

4.xx.1: 'is the time required . . . time period'→'is the time during which half of the amount of substance present at the beginning of the time period is eliminated'. The alternative definition should be deleted.

Clinical chemistry should follow the definition in atomic physics, therefore 'The order of reaction should be stated'→'The process must be adequately described by  $T_{1/2} = (\ln 2)/k_1$  where  $k_1$  is the rate constant.'

4.xx.1: Remark: should state that 'Elimination means any transformation or excretion of the original component'.

4.xx.1: Remark: 'In the case . . . rate constant'→'If the process is not described by the above equation the elimination function should be described by a sufficient number of paired values with  $x$  = time and  $y$  = amount of substance, mass or number.

If the volume of the system is constant and the reaction may be said to be of the first order (cf. *IUPAC Manual of Symbols and Terminology for Physico-chemical Quantities and Units*, 1970, Section 11.2) a concentration concept may be used instead of an amount.'

6. Amongst comments so far received on Tentative Nomenclature Appendices Nos. 20 and 21, fear had been expressed of too many abbreviations. CQUCC agreed. Those given were just examples of what might be used in *English* and what had been used in the 'List'. The final version of Appendix No. 21, Section 3.2 should stress this and add that when in doubt of understandability no abbreviation should be used. In publications abbreviations should not be used unless explained or given in each journal volume.

It had been suggested that 'catalytic amount' be renamed 'catalytic activity' (unit 'katal') and 'catalytic concentration' called 'catalytic activity per volume' with the unit 'Warburg'. Dr. DYBKAER's answer was accepted by CQUCC but the discussion on 'catalytic amount' should be amplified in an official reply.

Similar considerations featured in a very lively discussion with members of the Expert Panel on Enzymes of the IFCC Committee on Standards. The

central difficulty was to grasp that 'catalytic amount' was measured by a reaction rate, although it was not a reaction rate in itself but was an 'amount'. The divergences were not resolved completely, but the Expert Panel would consider using the nomenclature recommended by CQUCC (and until that moment by the IUPAC-IUB Commission on Biochemical Nomenclature) to avoid divergent usage.

In the discussion of Tentative Nomenclature Appendices Nos. 20 and 21 with EPQU, the following points were made.

The Swedish representative thoroughly discussed the conventions and abbreviations given in Appendix No. 21. The system was explained by CQUCC and it was stressed that (i) it was a recommendation, (ii) it applied to English, (iii) the names in the list were examples of how the system might look, not immutable constructions. Drs. N. E. SARIS (Finland) and A. H. GOWENLOCK (UK) agreed that it was an adaptable system within which names might change according to needs.

Dr. DYBKAER distributed a set of laboratory sheets from Danish Copenhagen Municipality hospitals showing how the system looked in print.

Dr. P. SEWELL (UK) suggested that a given size of unit be used always for a given type of quantity. Dr. DYBKAER explained that this might be too rigid and that the suitable magnitude could vary with which other quantities would be relevant for comparisons.

Prof. E. EGGER (GDR) asked whether replacement of mmHg by kilopascal was necessary in clinical chemistry. Dr. DYBKAER explained that the reading of mercury column heights did not yield pressure in mmHg directly, so why not calculate into kPa which was also used for partial pressures in gases. Dr. JØRGENSEN added that eventually blood pressure apparatus would be calibrated in kPa because industry was changing to SI units. Dr. SEWELL pointed out that this unit of pressure was now taught in UK schools.

Dr. SEWELL suggested that Appendix No. 20, Section 4.8, Note 3, should state explicitly that '1' be preferred. This was agreed.

The Swedish representative would abolish the Greek letter  $\mu$  for  $10^{-6}$  owing to difficulties with computer printout. Dr. DYBKAER explained that this was not up to CQUCC. Dr. JØRGENSEN added that local conventions might solve the problem (e.g., write MIKROMOL/L.).

The question arose whether in Appendix No. 20: Section 6.6. Clearance may not be abandoned in favour of 6.4. Mean volume rate or 6.5. Mean substance rate. CQUCC would consider this.

Prof. EGGER asked whether it was necessary to list both mass concentration and substance concentration for albumin in serum. Dr. DYBKAER stated that different circumstances warranted different choices. Dr. JØRGENSEN interjected that very often—contrary to common belief—more was known of amount of substance than of mass for a certain component.

The question arose when to use an arbitrary kind of quantity and when a well known kind of quantity. Dr. DYBKAER felt that the choice was arbitrary, but it depended on the method used for determination.

Prof. G. DE ANGELIS (Italy) supported by Dr. SARIS suggested that the inclusion in Appendix No. 21 of 9.A14 was more fun than help and CQUCC agreed to delete it.

Dr. GOWENLOCK asked whether metalloproteins in serum should be given as substance concentration on the basis of binding groups or whole protein molecules. Dr. DYBKAER explained that, ordinarily, the latter would be preferred, especially as one protein might bind different compounds in different proportions, e.g., albumin.

Dr. SARIS would like to see more proteins in the list. CQUCC would consider this possibility.

The Swedish representative doubted the wisdom of the 's' in Cholesterols (meaning cholesterol+cholesterol esters). This convention was explained by CQUCC (*cf.* Appendix No. 21, Section 4.8.3).

Prof. EGGER asked how one could state, for example, the concentration of all anions in serum without having the 'equivalent' or 'val'. The answer was S. Anions (negative charge), substance concentration.

A discussion occurred as to the advisability of classifying types of quantities in diagnostic groups. It was decided that this should be done according to local needs, not by CQUCC.

Prof. EGGER, supported by others, wanted a name and symbol for 'unity' so that factor(symbols) might be used for dimensionless quantities. CQUCC was sympathetic and promised to explore this matter which might have to be decided by *Conférence générale des Poids et Mesures*.

The Argentinian delegation, Drs. F. A. FARES TAIE and E. CHERNOFF, announced that the IUPAC-IFCC Recommendation 1966 had now been published in Spanish (see above) and copies were presented to Drs. JØRGENSEN and DYBKAER. Furthermore, the system was used in the teaching at universities and at professional meetings. Finally, *Bioquímica Clínica* had received a prestigious prize as the best scientific journal for 1971 in Argentina.

7. During the next year CQUCC planned to finish the manuscript for spectrometric kinds of quantities. Prof. HERMANN would cover emission and Prof. MÉTAIS absorption (with the help of a French group consisting of Profs. BOURDON, ROUSSELET, and ADOLPHE and also in contact with Association Française de Normalisation). The chemical kinds of quantities 'chemical potential', 'activity', *etc.*, would be explored by Dr. JØRGENSEN who stated that the subject was difficult and had not been completely explained by physicochemists.

Dr. JØRGENSEN pointed out that, in future, CQUCC documents would have to state explicitly that the recommended system had three independent facets (i) SI units should be used, (ii) kinds of quantities of a 'molecular nature' were preferred, and (iii) special conventions for constructing quantity names were suggested.

Dr. SEWELL asked that EPQU recommended the use of the type of quantity 'B—Hydrogen ion, substance concentration' instead of 'B—pH'. It was explained that this was outside the scope of CQUCC or EPQU. Dr. JØRGENSEN added that the subject was more difficult than one would think owing to the problems of defining the kinds of quantities.

8. The usefulness of, for example, three-letter abbreviations for enzymes was strongly advocated by Dr. SEWELL and the Swedish delegate. It quickly appeared that nonEnglish colleagues had difficulties accepting the proposed lists. CQUCC had also examined such lists and even tried constructing abbreviations for all quantities; the attempt was abandoned as unsatisfactory and leading to incomprehensibility. After much discussion it was finally agreed that such abbreviations must be of a local nature or tied to a certain language and that lists of explanation should be given.

R. DYBKAER



## SECTION ON CLINICAL CHEMISTRY

### Copenhagen, 19 July 1972

*Present:* Dr. D. B. TONKS (Chairman), Dr. M. C. SANZ (Past-Chairman), Prof. P. LOUS (Vice-Chairman), Dr. M. ROTH (Secretary), Prof. D. H. CURNOW, Prof. R. GRÄSBECK, Prof. A. L. LATNER, Prof. P. MÉTAIS, Prof. F. W. SUNDERMAN, JR. (Titular Members); Prof. H. BÜTTNER, Prof. A. DEFALQUE, Dr. R. DYBKAER, Prof. J. FREI, Prof. J. HOMOLKA, Prof. M. RUBIN (Associate Members); Prof. H. ALDERCREUTZ, Prof. E. KAISER, Dr. F. L. MITCHELL, Dr. J. C. NIXON, Prof. V. M. OREKHOVICH, Prof. Y. YAMAMURA (National Representatives); Prof. F. LUNDQUIST (Representative of IUB); Dr. J. BURET, Dr. EVRARD, Dr. A. H. HOLTZ, Dr. E. J. VAN KAMPEN, Prof. I. MASI, Dr. O. E. SKAUG, Prof. T. P. WHITEHEAD (Observers).

### Introduction

The Chairman recalled the memory of Prof. W. ROMAN, who had died last year. He had been a very active and much appreciated Member of the Section, with special interest in the teaching of clinical chemistry. The death had also been announced of Prof. H. F. WACHSMUTH and a replacement would be needed as National Representative of Belgium.

### Minutes of Previous Meeting

The version published in *Comptes Rendus XXVI Conference* (pp. 94-98) was approved.

### Abbreviations of Names of Enzymes

Commenting on a proposal for the introduction of abbreviations of names of enzymes, Dr. DYBKAER said that this would probably present too many difficulties (see p. 48). This view was shared by other Members of the Section.

### Proposed Commission on Clinical Toxicology

Dr. ROTH thought that the activity of such a Commission would concern the analysis in animal (especially human) tissues and fluids of toxic chemicals, with a view to the prevention, diagnosis, and treatment of their toxic effects. Problems relating to the control of air pollution should be left to the Section on Air Quality of the Applied Chemistry Division.

Prof. SUNDERMAN said that the subject of environmental toxicology, which included the assay in man of such compounds as mercury and pesticides, was becoming extremely important and required standardization, for example, of methods on an international basis. Prof. WHITEHEAD also stressed the importance of work concerning the effect of environment on human populations. He thought that international coordination in clinical toxicology now urgently required to be organized, and that this certainly lay within the scope and responsibility of IUPAC. The need was such that it justified the creation of the Commission, and the question of funds must be treated in consequence.

The above opinions were shared by other Members who strongly supported the creation of a Commission on Clinical Toxicology. The report of the *ad hoc* Committee (Dr. ROTH, Dr. TONKS, Prof. TRUHAUT) was endorsed by the Section.

## Report of Commission on Automation

Prof. WHITEHEAD said that the Commission had so far held six meetings. A detailed activity report had been submitted to the Section Committee. In Copenhagen, the first tentative version of 'Glossary of Terms used in Automatic Analysis' had been produced by the Commission. Two other intermediary documents had been accepted. There existed a considerable confusion due to the introduction of terms by companies. This process needed to be watched carefully.

The activity report was approved.

## Report of Commission on Quantities and Units

Since the last meeting in Washington, Dr. DYBKAER indicated that two documents prepared jointly by the Commission and IFCC had been published: 'Quantities and Units in Clinical Chemistry' and 'List of Quantities in Clinical Chemistry' as Tentative Nomenclature Appendices Nos. 20 and 21 (February 1972) to the *Information Bulletin*. These recommendations were open for comment until the end of October 1972.

The Argentinian Society had published a Spanish translation of the QU-R66 of the Commission. *Annales de Biologie clinique* had published 'Nomenclature en chimie clinique. Recommendations internationales concernant les quantités, unités et les résultats de laboratoire', by R. DYBKAER and P. MÉTAIS. A German text had been prepared with the help of Prof. HERMANN.

The new recommended system on quantities and units, including the use of molar units, was now completely introduced in Finland and Netherlands. Denmark was finalizing the introduction. In Germany, a few laboratories had already made the conversion, and others would try to do it in 1973. Sweden was aiming at conversion at the beginning of 1974. The Swiss Society had issued the preliminary documents to prepare the change. Argentina was very cooperative.

The Commission had examined manuscripts on new units and nomenclature in spectroscopy. There was some controversy on whether 'catalytic amount' could be used instead of 'catalytic activity'. The opinion of the Commission was that 'amount' was correct. The new enzyme unit 'katal' (symbolized by kat and defined as that amount converting 1 mol of substrate per second) was now officially approved by IUB. Dr. DYBKAER asked whether somebody had a name to propose for dimensionless quantities (hitherto represented by '1' or unity, which could not be used with a prefix denoting decimal fractions).

The International Committee for Standardization in Haematology had proposed a system overlapping with that of CQUCC. The discrepancies would be discussed in international meetings soon to be held in São Paulo, Washington DC, and Munich.

The activity report on CQUCC by Dr. DYBKAER was accepted. Dr. MASI reported that in Italy, introduction of the new units was not yet considered and asked whether an Italian translation of the recommendation could be prepared. Commenting on the situation in UK, Dr. MITCHELL said that it was intended to push the introduction of the new units as far as possible, but that this would not always be quite easy.

## Report of Commission on Teaching

Prof. RUBIN stressed the good relationship between IUPAC and IFCC, which was well reflected in the activity of this Commission. The present

objective was to issue a monograph presenting the status of the field in different countries. Prof. LOUS had been very active in serving as an editorial guide of the first draft of the monograph which was discussed in detail in Copenhagen. The draft was organized as follows:

#### *Part I*

1. Background Organizations, Members, Meetings, etc.
2. Introduction
3. History and Present State of Clinical Chemistry
4. Comparative Summary of the Situation in Different Countries
5. Set of Recommendations
6. Effort to Define what Future Trends might be

#### *Part II*

7. Description of the Situation in Each Country

For 5, it had been found difficult to reconcile the opinions of the different categories represented (physicians, chemists, pharmacists) to find guidelines for education. Subcommittees had therefore been appointed.

The text was now in process of being put into editorial uniformity. It was hoped that the monograph would be ready for submission to the Section Committee and the National Representatives for comment by the end of 1972. After approval by the IUPAC Executive Committee, publication could then be started early in 1973.

### **Interdivisional Committee on Nomenclature and Symbols**

Many IUPAC bodies were currently issuing recommendations on nomenclature, symbols, and units, sometimes without sufficient concern about what occurred in the other bodies. IUPAC would progressively pass into incoherence if the Interdivisional Committee failed to review seriously all these recommendations in order to eliminate redundancies, contradictions, and ambiguities.

### **International Office for Analytical Chemistry**

Prof. BÜTTNER reported that, as a consequence of the temporary withholding of the financial support which was initially planned by IUPAC, no further step had been taken in this matter.

### **National Representatives**

The Secretary asked the National Adhering Organizations to inform him promptly about changes in their Representatives. Prof. LOUS recommended that such changes be made not too frequently, in order to ensure some continuity in the work of Commissions such as the Commission on Teaching.

### **Liaison with IUB**

Dr. SANZ mentioned that IUPAC and IUB already had good contact at the highest level through a Liaison Committee, but that contact at the Section level was also necessary to prevent overlapping of activities. Therefore, he welcomed the presence of Prof. LUNDQUIST from IUB at the present meeting. Prof. LOUS suggested as a reciprocal measure that it might be worthwhile to appoint Dr. ROTH as a representative of the Section on Clinical Chemistry to IUB.

M. ROTH



## COMMISSION ON EQUILIBRIUM DATA (V.6)

Toronto, 26 June 1972

*Present:* Prof. D. N. HUME (Chairman), Prof. A. S. KERTES (Titular Members); Dr. S. AHRLAND, Prof. D. L. LEUSSING, Prof. K. YAMASAKI (Associate Members); Prof. A. E. MARTELL, Prof. K. B. YATZIMIRSKII (National Representatives).

### Chairman's Report

Prof. HUME reported on the activities of the Commission, summarizing the Status Report for the period April 1971–June 1972 recently sent to the Division Executive Committee. Progress was noted on the organization of data gathering networks and collection of current literature reports by Drs. E. HÖGFELDT and D. D. PERRIN. The report by Prof. Y. MARCUS *et al.* on 'Equilibrium Constants of Liquid-liquid Distribution Reactions, Part I: Organophosphorus Extractants' had been approved for publication by the Division Committee.

### Interim Secretary

Because of illness the Commission had been without a Secretary since the XXVI IUPAC Conference and the duties of the Secretary had been discharged by Prof. HUME, Prof. G. H. NANCOLLAS, and the IUPAC Secretariat. It was voted to approve the appointment of Prof. NANCOLLAS as Acting Secretary until such time as Dr. F. J. C. ROSSOTTI would be able to resume full responsibility for the Secretary's duties.

### Critical Surveys of Stability Constants

The Introductory Chapter by Prof. M. T. BECK had been twice revised and circulated to the Commission for comment and criticism. The most recent revision, having encountered no further objections, was voted approved for publication. It would be forwarded to the Division Secretary for approval and publication when one or two of the critical surveys had been revised and approved to go with it.

The survey of cyanide complex stability constants had been delayed by the discovery of new material requiring further revisions. Prof. BECK hoped to complete the work this summer. The revision of the EDTA manuscript had not yet been received from Prof. G. ANDEREGG but was expected soon. Prof. YATZIMIRSKII reported that the reviews of gold and halide complexes which had been promised, turned out not to be of high enough quality to justify inclusion and were therefore withdrawn. No word had been received from Prof. G. BIEDERMANN on his progress in the revision of the report on Standard Ionic Media but it was said by someone who had seen him recently that he was enthusiastic about the project and expected to have it completed soon. A revised version of the report 'Critical Evaluation of Some Equilibrium Constants involving Organophosphorus Extractants' by Prof. MARCUS incorporating the comments and criticisms of the liquid-liquid distribution Project Group, the Chairman, and the Acting Secretary, was voted approved for publication.

There was considerable discussion of the future course of the Critical Surveys project, in which it was agreed that efforts should be made to solicit surveys from interested workers outside the Commission. Emphasis was

placed on the need for high standards of critical evaluation and the material in the first part of the first edition of *Stability Constants of Metal-ion Complexes* was suggested for guidelines. Prof. BECK as Project Leader should take the initiative in solicitation.

### **Ion Exchange Equilibrium Constants**

A manuscript by MARCUS and HOWREY giving a compilation of ion exchange equilibrium constants had been prepared and distributed to the Commission Members for comment and criticism. There was some discussion of the report and while the tables themselves were uniformly admired, it was felt that the introduction should spell out in greater detail the caveats necessary for the proper use of them. It was voted to approve the report in principle and empower the Chairman and Secretary to recommend a revised version for publication if the objections and criticisms submitted by Commission Members were satisfactorily met.

### **Liquid-liquid Distribution Equilibria**

As noted above, the final version of Part I, 'Organophosphorus Extractants', had been approved by the Division Committee and was ready for publication. Comments by Division Committee Members, forwarded by the Division Secretary, were read out. Part II, 'Alkyl-amine Extractants' had been circulated within the Commission for criticism and a revised version was in preparation. Part III, 'Compound forming Extractants', was in the final stages of preparation in draft form. Because of the size of the liquid-liquid distribution tables and the highly specialized nature of the material, it had been the practice so far to circulate the tables themselves only to the Members of the liquid-liquid distribution Project Groups (FREISER, KERTES, MARCUS, STARÝ, ZOLOTOV) and the Commission Officers. Introductory material incorporating explanatory discussion or matters which might involve policy or nomenclature had been sent to all Members together with a few sample pages of the tables, unless these Members requested the full report. This procedure was discussed and approved by the Commission, and the Officers were voted power to give final approval to revised versions of Parts II and III if in their judgement, the reviewing had been thorough and agreement reached within the speciality Group. It was agreed that comments from the full Group were most desirable and the Chairman was asked to write to Dr. J. STARÝ for his comments on Part II.

The Chairman read a letter from Dr. STARÝ reporting that a preliminary draft (167 pages) of tables of constants of chelating extractants had been sent to Prof. H. FREISER for checking and additional data. The letter also asked for the Commission's opinion on several points: (a) should mixed-ligand data including nonchelating agents be included? (b) should data regarding dissociation of parent ligands as reported in the original papers be included? and (c) should the order of arrangement by class of extractants be used? The Commission agreed immediately to the inclusion of (a) and (b) but felt that the complex matter of (c) was not resolvable at the present meeting and an effort should be made to communicate more clearly to Dr. STARÝ the nature of the compromises which had been negotiated at Washington to avoid an impasse between two conflicting systems of classification, and that the matter be resolved within the liquid-liquid distribution Group.

## **Solubility Data Project**

The June 1972 Interim Report of the Project Group was discussed, copies of letters from potential collaborators and advisers were circulated, and opinions expressed by absent Members summarized. The general feeling seemed to be that the project had scientific merit but the magnitude of the undertaking raised very serious problems of workload, organization, and finance. It was agreed that if undertaken, the project should not be a full scale data-gathering undertaking carried out in its entirety by the Commission as has been the Stability Constants Project. It was felt by the majority of the Members to be a proper and appropriate activity of the Commission to help organize an international solubility data project and act in an advisory capacity to it if this seemed desirable, and if the ongoing projects of the Commission would not suffer. The present proposal was too lacking in detail to permit any definite decision to be made. The Project Group (now to consist of HUME, KERTES, and NANCOLLAS) was charged with the responsibility of formulating a proposal in some detail, outlining the scope, structure and possible format of the compilation; the organization of the effort with suggestions for potential subgroup leaders; and clarifying the relationship between this Commission and the Solubility Project. This proposal should be circulated within the Commission in draft form for comments and questions in good time to be revised and recirculated in final form well before the 1973 Conference, at which, if approved, it would be submitted to the Division Committee for official sanction. The Project Group was also instructed to clear any doubtful matters of policy with the appropriate IUPAC authorities, and to check for possible conflicts with projects of other Divisions.

## **Publication Policies**

The necessity of having some financial support for extensive data-gathering projects was brought out and the reasonableness of returning some of the profits from the sale of compilations was argued. In this respect dissatisfaction with the handling of *Stability Constants of Metal-ion Complexes* was expressed.

## **Data Retrieval**

Profs. LEUSSING and HUME reported on the activity of the Data Flagging Project, proposed by this Commission and authorized as an inter-Commission project by the Division Committee at Washington. At present, Chemical Abstracts Service was not inclined to flag numerical data although this was not a final decision. CAS was now considering changes which would have to result if the American Chemical Society was to change over from publishing complete papers in its basic journals to a policy of publishing abstracts and making complete texts available only through microfilm. Members of the Commission felt that IUPAC at an appropriately high level should be taking a more aggressive stand in representing the interests of international chemistry where national organizations might be taking unilateral actions which affected everyone.

## **Other Business**

A letter of enquiry from Dr. M. THOMPSON (UK) was read. The Chairman was instructed to inform Dr. THOMPSON that a project to evaluate and recommend computer programmes for calculation of equilibrium constants was beyond the scope of this Commission.

D. N. HUME



## COMMISSION ON COLLOID AND SURFACE CHEMISTRY (I.6)

Palm Beach, Florida, 17-19 August 1972

The meeting was confined to the Project Group on Nomenclature for Heterogeneous Catalysis.

*Present:* Prof. R. L. BURWELL, JR. (Chairman of Project Group), Prof. H. VAN OLPHEN (Secretary of Commission), Prof. C. KEMBALL (Titular Members); Prof. G. K. BORESKOV, Prof. G. A. SCHUIT, Prof. K. TAMARU (Associate Members); Prof. M. BOUDART, Prof. J. HORIUTI, Prof. F. S. STONE (Observers).

Draft tentative nomenclature recommendations previously elaborated by the Project Group were reconsidered. Agreement was reached on a revised document which would be sent for comment by the Commission on Physicochemical Symbols, Terminology, and Units at its forthcoming meeting in Paris (17-18 October 1972).

It was hoped to submit the revised document for acceptance by the full Commission on Colloid and Surface Chemistry and for approval by the Physical Chemistry Division Committee at the XXVII IUPAC Conference (1973). Thereafter, the recommendations should be published as a Tentative Nomenclature Appendix to the *Information Bulletin*.

The recommendations were based on the same general principles as those used in *Manual of Symbols and Terminology for Physicochemical Quantities and Units* [*Pure Appl. Chem.*, **21** (1), 1 (1970)] and its recently published Appendix II, *Definitions, Terminology, and Symbols in Colloid and Surface Chemistry—I* [*Pure Appl. Chem.*, **31** (4), 577 (1972)].

H. VAN OLPHEN

## SECTION ON FOOD (VI.1)

Kungälv, Göteborg, 23-25 August 1972

*Present:* Dr. H. EGAN (Chairman), Dr. A. J. COLLINGS (Secretary), Dr. H. GUTHENBERG, Dr. E. O. HAENNI, Dr. K. KOJIMA, Dr. R. MARCUSE, Dr. A. E. WASSERMAN (Titular Members); Dr. H. FISCHBACH, Dr. P. L. SCHULLER, Prof. R. TRUHAUT (Associate Members); Dr. E. LÜCK, Dr. D. N. RHODES (National Representatives); and, by invitation, Prof. G. GRIMMER, Mr. D. F. DODGEN, Dr. A. EDHBORG, Prof. A. RUTKOWSKI, Mr. E. A. WALKER, Prof. W. BALTES (Commission on Food Additives); Dr. N. R. JONES, Dr. P. KROGH, Dr. K. OHNO, Dr. B. L. OSER, Dr. I. F. H. PURCHASE, Dr. A. D. CAMPBELL, Prof. L. ACKER (Commission on Food Contaminants); Dr. I. BOSUND (Applied Chemistry Division Committee); and Prof. F. PELLERIN (Commission on Analytical Reactions and Reagents).

1. Dr. EGAN opened the proceedings by welcoming the Members of the Section and Commissions who were attending the meeting for the first time.

2. The agenda was adopted and the minutes of the meetings held on 16-17 July 1971 in Washington (*Comptes Rendus XXVI Conference*, pp. 201-206) were approved. The Chairman reminded Members that with the reorganization of the Section and the Commissions, the Washington minutes referred in parts to former Commissions. It was important for the present Commissions to consider the previous minutes to ensure that no item was left which required to be progressed.

3. Dr. EGAN informed the Section that the matter of election of a Chairman of the Food Section might be on the agenda in 1973.
4. Dr. OSER regretted that he was unable to attend the Washington meetings and enquired about the choice of areas of work delegated to the respective Commissions. Dr. EGAN explained that difficulty had been experienced at Washington in selecting suitable names for the two Commissions; 'Food Contaminants Commission' and 'Food Additives Commission' had been agreed but it had been recognized that there would be some anomalies, *e.g.*, the Food Contaminants Commission had SCP in its programme. Dr. OSER suggested that the two Commissions might be renamed 'Food Quality Commission' and 'Food Additives Problem Commission', respectively. It was agreed to give further consideration to these points in 1973 and other suggestions were invited by correspondence.
5. Dr. PURCHASE enquired of the progress the Food Section had made in obtaining finance for an Aflatoxin Check Sample Survey. It had been decided at the 1971 meeting to ask the Bureau to look into the matter. It was recognized that the check sample programme was a vital one in aflatoxin methodology and that a definite financial policy was required. In order to prepare the samples, laboratory facilities would be required but the IUPAC Secretariat could only act as a distribution centre or to provide secretarial help. Dr. EGAN reminded the Section that before any case could be put forward, careful costing would have to be carried out. Dr. CAMPBELL reported that the number of participants in the second check sample study had dropped to 100 so the coverage was not as large as before. Dr. JONES reported that the Protein Advisory Group (PAG) of FAO/WHO/UNICEF had already been approached about finance but had declined. It was also suggested that, following the successful symposium in Kungälv on mycotoxins, an approach to WHO might be appropriate.
6. Dr. EGAN reported that the Applied Chemistry Division Committee would be meeting at the end of September when the Division President, Dr. R. W. CAIRNS, would discuss further rationalization of the programme of the Division. An updated report from the Food Section to the Applied Chemistry Division was before the meeting. Dr. CAIRNS had commented that the Food Section, the Pesticides Section, and the Oils and Fats Section had a high analytical content to their programmes. There might be need to consider a stronger link between these programmes and the Analytical Chemistry Division of IUPAC although such a link existed at the moment in the case of the Food Section.
7. Dr. EGAN reported that arrangements for the IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies, to be held in Hamburg (29-31 August 1973), were well in hand. A first circular had been issued and it was hoped to have a second circular, a draft timetable for which was before the meeting, by the end of the year giving details of the invited speakers with a further invitation to others to submit papers. It was proposed that a business meeting should also be held between IUPAC and IUFoST to discuss continued cooperation between the two Unions. It was suggested that an IUFoST Observer might be invited to attend the next meeting of the Food Section.
8. Dr. EGAN reported that he had attended the SCP meeting arranged in France by British Petroleum earlier in the year, together with Dr. J. C. HOOGERHEIDE (Fermentation Industries Section) and Prof. TRUHAUT. The

meeting had been useful but had not specifically covered the areas of interest to IUPAC. Subsequently, the Fermentation Industries Section proposed specifications for SCP and these had been circulated to Members of the Food Section. Dr. JONES emphasized that it was important to distinguish between these proposals and the requirements of PAG. He considered that it was the role of the Food Section and its Commissions to comment on specifications but not to deal with the actual values to be inserted in them. PAG had sought advice on methods for available lysine in food. The Food Contaminants Commission had considered this request and recommended that the methods which had already been proposed could be endorsed, the Carpenter method being now well established and generally accepted. The Fermentation Industries Section specifications related mainly to SCP used in animal food. Dr. JONES suggested that the Food Section should comment on the specifications put forward by the Fermentation Industries Section and indicate the difference between these and those which would be required for human use.

9. Dr. HAENNI reported that the Food Additives Commission had issued two appendices to the *Information Bulletin*, Technical Reports Nos. 4 and 5 (February 1972): a survey of nitrosamine methodology and a multicomponent method for traces of polynuclear aromatic hydrocarbons in food. The Commission had taken part in the IARC Ring Test on nitrosamine estimation in which 19 laboratories had participated, the results being  $\pm 10\%$  of the expected results. A review on trace nitrate and nitrite analysis had been prepared: both AOAC and CEE required methods for these entities and Dr. RHODES offered to provide assistance on the matter. There were some questions as to the use of  $\alpha$ -naphthylamine as a reagent. A survey had been undertaken by Prof. BELITZ on amine and amide precursors in food but specific methods could not be recommended at present. It was agreed that polyphosphates should be dropped from the programme. A multicomponent method for antioxidants in food was expected to be presented to the AOAC Annual Meeting in October and would be given further consideration thereafter. CEE was also interested in antioxidant analysis. Prof. ACKER had presented a specific method for traces of urethane in beverages.

10. Dr. MARCUSE reported that the Food Contaminants Commission had been looking at methods for trace metals in foods. In particular it had studied methods for total mercury in fish and had suitably modified the present (1965) IUPAC method to include an atomic absorption finish. The new method, which had been provided by Dr. SCHULLER, met the various points which had been made with regard to the earlier IUPAC method and procedure. It was now proposed to look at the effect on any iodine present in fish; a collaborative study of the revised method would then be considered. Dr. KOJIMA had modified the present (1965) IUPAC method for lead, incorporating an atomic absorption finish; it would be circulated to Members of the Food Section for comment. Dr. EGAN reminded the Food Contaminants Commission that CEE had requirements for methods for traces of lead, mercury, and copper. A review on cadmium was being prepared by Dr. COLLINGS and would be circulated. A review of methods for selenium prepared by Dr. SANDLER had been circulated for comment; it was agreed that Drs. SANDLER and COLES should be invited to correspond, with particular reference to the need for a method for CEE. A review on methods of analysis for fluorine would shortly be available. Dr. PURCHASE reported that the aflatoxin collaborative study on the stability of aflatoxin M<sub>1</sub> standard, had



been completed satisfactorily. A method for aflatoxin M<sub>1</sub> residues in milk was complete. There was wide interest in this subject: international support was needed (see 5) and it was agreed that an official approach be made to WHO for finance. A method for ochratoxin residues in food had been developed and would be included in a new collaborative study. There was also a particular need for rapid methods for traces of mycotoxins in foods, but it was agreed that further consideration would have to await the outcome of present work.

The Chairman congratulated the Commission on the very successful Mycotoxins Symposium held in Kungälv immediately before the present meeting at which some 80 delegates had been present. He was warmly supported by all members of the Section, who extended special thanks to Drs. MARCUSE and GUTHENBURG for organizing the Symposium.

11. Dr. JONES reported on the work on SCP. Methods for available lysine had now been prepared and circulated to Members: comments (to Dr. JONES) were invited by 15 October 1972.

12. Dr. COLLINGS reported that draft specifications for dispersion solvents had been circulated for comment. Further information was expected and would be incorporated in the final document, which would now be prepared.

13. Prof. TRUHAUT reported that a meeting had been held with representatives of the CEE Scientific Commission in Brussels on 4 November 1971 and that the Liaison Committee of the Food Section and the Analytical Reactions and Reagents Commission had discussed arrangements for the 1972 IUPAC-CEE contract in Amsterdam on 4 January 1972 and in Kungälv on 24 August 1972. The CEE Scientific Commission had subsequently agreed that the original basic document of 1966, from which criteria for which analytical methods were sought by CEE, should now in effect be replaced by the minutes of the November and January meetings, copies of which had been circulated. Twenty methods were needed in fulfillment of the CEE contract but it was proposed, as in previous years, to send 30 methods. For the 1972 contract, 9 methods had already been sent in advance in February 1972. A further 31 methods had been examined. Prof. PELLERIN introduced his report on these methods, together with comments received from Prof. REITH. The method for arsenic would be further considered by Mr. J. L. MONKMAN (Air Quality Section), the remaining 30 methods being approved. It was agreed that 11 methods should be selected from them by Prof. PELLERIN and (subject to editorial correction) forwarded to CEE, leaving up to 19 methods available in advance for the 1973 IUPAC-CEE contract.

Prof. TRUHAUT also reported that he had tried unsuccessfully to arrange a further meeting with the CEE Scientific Commission to discuss detailed proposals for the 1973 IUPAC-CEE contract. He therefore proposed that the methods selected by the Liaison Committee on 24 August 1972 from those in the minutes of the 1971/72 meetings referred to above should be developed for the new contract. In this connection the Food Additives Commission was requested to give priority to consideration of a method for polynuclear aromatic hydrocarbons in soluble food colours, required by 15 February 1973; and the Food Contaminants Commission was requested to give priority to the consideration of a general method for copper and to putting the present methods for traces of lead and mercury into forms suitable for application to soluble food additives.

14. Mr. WALKER reported that IARC was publishing monographs on environmental carcinogens and would welcome expert advice on chemical aspects.

15. Dr. EGAN reported that ISO had to date requested IUPAC comment on a number of draft standards relating to food. It was agreed that the Chairman and Secretary should continue to make arrangements to deal with these matters as in the past, referring details to individual Members where desirable.

16. Dr. EGAN reported that he had attended the VII Working Meeting of ICC on behalf of the Applied Chemistry Division and had proposed that there should be continued liaison between ICC and IUPAC for the interchange of information.

17. Dr. COLLINGS reported that the Executive Secretary of AOAC, Dr. W. HORWITZ, had written to several Sections of IUPAC inviting cooperation. It had been suggested that AOAC might become an Associated Organization of IUPAC so that the Association could send representatives to meetings and take a fuller part in the discussion of programmes of work.

18. It was agreed that arrangements for a joint meeting in 1973 with the Pesticides Section (which had not met during 1972) should be discussed with that Section.

19. Following the meetings of their respective Commissions, Dr. HAENNI and Dr. MARCUSE presented reports from the Food Additives Commission and the Food Contaminants Commission. It was agreed that the subject of antibiotic residues in food should be handled by the Food Section and that the broad subjects to be considered by the two Commissions were as follows:

- (a) Food Additives Commission: trace nitrosamine analysis and precursor amines, antioxidant residues, nitrates and nitrites.
- (b) Food Contaminants Commission: methods for copper, lead, cadmium, fluoride, selenium, total mercury; mycotoxins; SCP matters (except polynuclear aromatic hydrocarbons); dispersion solvents.

20. The Chairman invited discussion on possible topics for a symposium which might be arranged in conjunction with the 1974 meeting of the Food Section and its Commissions. It was agreed that nitrosamines should be left to the IARC programme. Another mycotoxin symposium might be appropriate; alternatively and in view of the large number of collaborative studies going on at the moment, it might be useful to bring together all those concerned in arranging them to discuss the possible harmonization of effort.

21. Dr. EGAN indicated that there were two Membership vacancies in the Food Additives Commission and that further vacancies would arise in 1973. Proposals, supported by brief background details of the individuals concerned, should be sent to Dr. COLLINGS as soon as possible, preferably by 31 December 1972.

22. It was agreed that publication of the collaborative study on polynuclear aromatic hydrocarbons in food should await the outcome of current collaborative studies.

H. EGAN

**COORDINATING COMMITTEE FOR ANALYTICAL  
METHODS FOR CEE AND IARC  
Kungälv, Göteborg, 24 August 1972**

*Present:* Prof. R. TRUHAUT (Chairman), Prof. F. PELLERIN (Secretary), Dr. H. EGAN, Dr. R. MARCUSE. The meeting was effectively of the Liaison Committee

of the Commission on Analytical Reactions and Reagents (V.1) and the Food Section (VI.1) to handle the IUPAC-CEE 1972 contract. Therefore, Dr. A. COLLINGS and Dr. H. GUTHENBERG were also in attendance. Prof. TRUHAUT presented apologies for absence from Prof. R. BELCHER, and Mr. I. GAERNER, Secretary General of the CEE Scientific Commission.

### **Report of Meeting in Amsterdam**

The meeting held in Amsterdam (4 January 1972) with Dr. W. GALLAY, Secretary General of IUPAC, mainly involved the report of the joint IUPAC-CEE meeting in Brussels (4 November 1971) and finalizing it following receipt of remarks from Mr. L. G. RABOT, Director of Agriculture of CEE, dated 21 December 1971. This report, written by Profs. TRUHAUT and PELLERIN, was circulated on 26 January 1972.

The report was approved at the current meeting in Kungälv. Prof. TRUHAUT and the Members of the Liaison Committee agreed that the reports of the meetings in Brussels and Amsterdam should constitute the new basic document with CEE, replacing that of May 1966. The IUPAC Secretariat had been requested to send these documents to all Members of Commission V.1 and Section VI.1, as well as to Members of the Bureau of IUPAC.

### **Comments arising from Amsterdam Meeting**

At the Amsterdam meeting it was decided to send CEE, as soon as possible, 9 methods in partial fulfillment of the 1972 contract. These methods were sent to CEE on 4 February 1972 under reference 216/MW/MG/72.

Some 31 other methods were held back. They had been circulated in the usual manner to members of Commission V.1 and Section VI.1. Comments were received by Prof. PELLERIN, who subsequently incorporated them in the report which was sent to Members of the Coordinating Committee on 21 June 1972 (825/RR/SE/72).

### **Approval of Methods for 1972 Contract**

Prof. PELLERIN's report was studied by the Liaison Committee. Remarks from several Members of Commission V.1 and Section VI.1 made at a meeting in Birmingham on 4 July 1972 were also considered (Prof. BELCHER, Dr. EGAN, Dr. COLLINGS, Dr. M. KAPEL: Unconfirmed minutes distributed under 906/RR/CAD/72). Both of these reports were approved. Subsequent remarks made by Prof. J. F. REITH and Mr. J. L. MONKMAN were noted by Prof. TRUHAUT.

Prof. REITH had raised the question of choice of subjects. The choice of tests was laid down by CEE. Thus, amongst the examples cited by Prof. REITH, research on total chromium in food colouring agents was motivated by the use of chromic anhydride as an oxidizing agent in certain syntheses. The test for oxalic acid (30/68) could not be necessarily applied to lactic, citric and tartaric acids (3-10/70). This general method was no longer applicable.

Prof. REITH asked that Members of the Commission be informed about the basis for choosing methods. Thus, CEE's choice of two methods for research on lead (polarography 3/68; limit test 2/68) was motivated by the necessity to give the food industry methods adapted to their respective requirements.

Dr. EGAN recalled that the proposed methods were to be codified for legal purposes in case of dispute. Finally, the methods were chosen following



discussion and comments received. This was how, for example, method 37/68 for research on fluoride in food additives was rejected in Washington and replaced by a method proposed by Prof. REITH which appeared in the actual programme as 23/72.

The application of tests on a group of additives or sometimes on a sole additive depended entirely on a request from CEE. The IUPAC experts must therefore check whether methods previously proposed were still applicable. Prof. REITH had remarked on the lack of uniformity in methods of ashing (3/68—lead in colouring agents; 7/68—chromium in colouring agents). This was as a result of the distribution of the work involved. One method was held back in view of further valuable information provided by a Member whose wish to standardize would require an additional long period of study.

Finally, Prof. REITH had enquired why methods were not subjected to test by CEE. This was a statement of fact the explanation of which was that the methods had to be published so that they might be used in the various CEE countries and thus be commented on. For the moment, the CEE authorities relied on the IUPAC experts.

In the limit test for arsenic in antimicrobials and antioxidants, Mr. MONKMAN disputed the wavelength used for measurement; the use of ethanolamine to replace pyridine proposed by Dr. A. HULANICKI; and he proposed modifications in the apparatus. The Liaison Committee decided to postpone sending this method to CEE. In view of Mr. MONKMAN's expertise and personal research in this field, Prof. TRUHAUT thought Mr. MONKMAN should be invited to elaborate a revised version of this test (25/72) applicable to food additives rather than samples of biological (urine) and vegetable origins.

In the limit test for lead in food additives (24/72), Mr. MONKMAN drew attention to the toxicity of carbon tetrachloride through pulmonary or surface penetration. He proposed its replacement by chloroform. Prof. PELLERIN mentioned that these two solvents were not completely interchangeable. With chloroform the operating conditions were not always exactly the same as for carbon tetrachloride. Changing the solvent, therefore, would require some experimental study. The replacement of carbon tetrachloride by chloroform would be considered at a later date.

The method might go ahead as it was, but a note should be added to the test drawing attention to the dangers of using carbon tetrachloride and indicating that the test must be done under a well ventilated hood and avoiding all contact with the skin during use of the dithizone solution. Dr. EGAN would write to Mr. MONKMAN about this matter and discuss it with him when they met in September 1972.

### **Dispatch of Methods to CEE**

Noting Prof. PELLERIN's reports, the minutes of the 4 July 1972 meeting in Birmingham, and Prof. REITH's and Mr. MONKMAN's remarks, the situation was now as follows:

- (a) Limit test for arsenic (method 25/72) was rejected. It would be revised by Mr. MONKMAN.
- (b) The other 30 methods were accepted. Prof. PELLERIN would review the methods written in French. Drs. COLLINGS and EGAN would review the English methods. They would send the text (RE/1) to Prof. PELLERIN by 15 September. This procedure was chosen to try and avoid a further meeting of the Liaison Committee for revision purposes which would involve an increase in expense for IUPAC. After examination by Profs.

TRUHAUT and PELLERIN, the complete set would be passed to Dr. EGAN before being sent from the IUPAC Secretariat to CEE by the deadline of 31 October 1972.

- (c) The 1972 contract required provision of 20 methods. At the meeting in Brussels (4 November 1971) CEE expressed the wish to complete methods relating to the analytical control of purity criteria at the end of 1972. Thus, the 1972 contract would be completed with the dispatch of the following methods:

9 methods sent on 4 February 1972

11 methods accepted at Kungälv-Göteborg

The other 19 methods accepted at Kungälv-Göteborg would be sent to CEE in advance as partial fulfillment of the 1973 contract.

### **Methods for Determination of Lead, Copper, and Mercury by Atomic Absorption Spectroscopy**

Atomic absorption spectroscopy for the determination of traces of these elements in food additives was in course of study by the Food Contaminants Commission and the Food Section:

Copper—Dr. MARCUSE, Lead—Dr. K. KOJIMA, Mercury—Dr. P. L. SCHULLER.

These methods were to be sent to Dr. COLLINGS by 15 February 1973 for inclusion in the 1973 CEE contract. These determinations were also the object of study by Commission V.1. Methods received by Prof. PELLERIN would be sent to Dr. COLLINGS.

### **Methods for 1973 CEE Contract**

Numbering of the new methods would follow the system proposed by Prof. TRUHAUT:

- 1-99 — general purity criteria
- 100-199 — colouring agents in food
- 200-299 — antimicrobials
- 300-399 — antioxidants
- 400-499 — emulsifiers and stabilizers

Prof. TRUHAUT informed the meeting that CEE had not yet issued any directives on the 1973 contract and he hoped that these would be forthcoming in the immediate future. Referring to the new basic document, Dr. EGAN would draw up a list of methods remaining to be studied.

### **Standing Orders**

Prof. TRUHAUT had received a letter from the President of IUPAC, Prof. BÉNARD, requesting that composition and terms of office plus terms of reference be drafted for the Coordinating Committee. These would form the basis of Standing Orders of the Executive Committee regarding the Coordinating Committee—standing orders were being prepared for all committees attached to the Bureau (Executive Committee). The matter was deferred for consideration by the whole Coordinating Committee at its meeting during the XXVII IUPAC Conference (1973).

## Other Matters

Prof. PELLERIN mentioned that method 16/68 (determination of trace metals by X-ray fluorescence in food colouring agents) and 11/68 (determination of mercury in food colouring agents) were currently in course of editorial revision by Dr. KAPEL. These methods were awaited by CEE. Prof. PELLERIN would request their return from Dr. KAPEL so that they might be sent to CEE without delay.

## Date of Next Meeting

The Coordinating Committee would meet in Paris during the first fortnight of March 1973, on a date to be fixed shortly by Prof. TRUHAUT. The object of that meeting would be to assemble methods for the 1973 CEE contract in the normal way: dates for circulation of documents, comments to Prof. PELLERIN, preparation and circulation of his report. Preparations for the meeting in Munich would also be discussed. Immediately after the Paris meeting Prof. TRUHAUT would organize a joint meeting with CEE to discuss progress on the programme of methods to be adopted.

R. TRUHAUT

## SECTION ON MEDICINAL CHEMISTRY Milan, 11-12 September 1972

*Present:* Prof. E. CAMPAIGNE (Chairman), Dr. A. I. RACHLIN (Secretary), Prof. A. ALBERT, Prof. E. J. ARIËNS, Dr. M. PROTIVA, Dr. F. L. ROSE, Prof. P. SENSI (Titular Members); Dr. J. F. CAVALLA, Dr. J. THUILLIER (Associate Members); Prof. W. TH. NAUTA, Prof. P. PRATESI, Prof. K. E. SCHULTE (Observers).

## WHO Liaison regarding Nonproprietary Names of Drugs

Because the Section was concerned about the correctness of the chemical names corresponding to international nonproprietary names (INN) for pharmaceutical substances, Prof. CAMPAIGNE had met with Dr. O. WALLÉN, Chief Pharmaceutical Officer of WHO, in Washington subsequent to the XXVI IUPAC Conference. Prof. CAMPAIGNE, after determining that Dr. WALLÉN sent the galleys of the INN lists to Dr. C. T. VAN METER for a check on the chemical nomenclature, suggested that Dr. K. L. LOENING, Director of Nomenclature for Chemical Abstracts Service and a Member of the IUPAC Commission on Nomenclature of Organic Chemistry, should participate in the checking process. It had been agreed by all involved, that both Dr. VAN METER and Dr. LOENING would receive the INN lists for comment prior to the final printing. While IUPAC and Chemical Abstracts nomenclature sometimes differed, there would at least be a dialogue between the principals which should enable selection of correct and, hopefully, mutually acceptable names.

Still unresolved was the confusion relating to the use of generic names. Different names were frequently used for the same substance in some countries (Prof. ALBERT cited several examples) and furthermore, some of the names in use differed from those which were accepted by WHO. After an animated discussion of this problem it was decided to have a pertinent notice, prepared



by Profs. ALBERT and ARIËNS, inserted into the Section Newsletter and to have the Secretary request that all Correspondents of the Section call this matter to the attention of the proper authorities in their respective countries, urging that they used WHO names. The Secretary was also instructed to express the concern of the Section to Dr. WALLÉN and to offer its help and cooperation in searching for a solution.

### **CODATA Questionnaire**

The CODATA questionnaire about data compilations which had been sent to all Members by Prof. W. KLEMM was discussed. It was agreed that existing compendia were of little general use to medicinal chemists. From the Section's point of view, two types of data should be assembled: (i) properties of organic compounds, such as melting points, spectral data, ionization constants, dipole moments, *etc.*, and (ii) data applicable to biologically interesting substances such as solubilities in solvents and buffers, distribution coefficients, potential toxicities, *etc.* Prof. CAMPAIGNE would write to Prof. KLEMM expressing these viewpoints and offering the Section's services if they were needed, *i.e.*, selection of qualified experts, setting up a committee if so indicated, *etc.*

### **XXVI World Health Assembly (Geneva, May 1973)**

The Section's attention had been directed to the XXVI World Health Assembly and, as a potentially interested IUPAC body, it was requested to register comments for possible consideration before 15 December 1972. The points of interest to the Section were (i) distribution and traffic in therapeutic drugs, and (ii) the use of WHO-approved generic names.

### **Newsletter**

Dr. RACHLIN reported that Newsletter No. 5 (July 1972) was mailed to 169 addresses. Since it was sent by airmail, cost prohibited distribution to individual officers of corresponding organizations, as was suggested in Washington. Instead, a statement had been inserted urging reproduction and distribution by recipients. Dr. RACHLIN was willing, on request, to send extra copies by surface mail to those on the mailing list. Members were urged to contribute signed items on any timely topic of general interest to the community of medicinal chemists.

### **Correspondents**

No additions had been made to the list of Correspondents. The Section still lacked proper contacts with South America, Africa, the near-east and even some European countries such as Spain and Sweden. The Members would try to rectify this situation, especially with regard to the European countries.

### **Medicinal Chemistry Award**

Dr. RACHLIN gave the results of his poll on the availability of medicinal chemistry awards. Replies were received from 11 countries of which 7 had no such activity and 4 had 1 or 2 national awards. There appeared to be no international recognition in this field. Discussion brought out the difficulties which would be encountered in instituting an international award on an equitable basis. The Section could, however, promote more national activity and use its Newsletter to publicize awards which were made.

## SCOPE

The ICSU Scientific Committee on Problems of the Environment (SCOPE) met in Canberra during 1-3 September 1971. This meeting was covered by Prof. ALBERT who reported that none of the problems involved fell within the purview of the Section and no action was required on its part. The discussion, however, digressed to the toxicity of compounds which was of great concern to the Section. It was concluded that Prof. ARIËNS should prepare a short statement on toxicity for publication in the Newsletter.

### Committee on Symposia and Meetings

Prof. ARIËNS reported on the following items:

- (i) The proposed pyrimidines symposium, intended for USA in 1973, did not materialize because NIH had refused financial support.
- (ii) The Medicinal Chemistry Division of the Chemical Institute of Canada would cosponsor the IX Natural Products Symposium with the IUPAC Division of Organic Chemistry at Ottawa during 24-28 June 1974.
- (iii) The Section's request for joint participation in the IX International Congress of Biochemistry (Stockholm, 1-7 July 1973) had been declined by IUB.
- (iv) There had been correspondence with Dr. J. CANNON, ACS Division of Medicinal Chemistry, relative to joint sponsorship of an international symposium, possibly in 1974. There had been no recent response from Dr. CANNON but, in view of (ii), action in 1974 was not possible. Prof. CAMPAIGNE would negotiate with the American group about a later date.
- (v) The XXV IUPAC Congress was presently scheduled to be held in Israel in 1975 and steps should be taken to include medicinal chemistry in the basic format of the Congress. Dr. RACHLIN would bring this matter to the attention of Prof. S. SAREL, the Section's Correspondent in Israel, and Prof. ARIËNS would follow up.
- (vi) The European Committee on Medicinal Chemistry was reorganizing as a federation. This group was considering plans to hold medicinal chemistry symposia in Europe on even-numbered years, possibly with IUPAC sponsorship.
- (vii) Prof. YAKOVLEV's proposal for a symposium on approaches to drug discovery was not discussed because of his absence and lack of detailed information.

Prof. SCHULTE reported that the topic for the Medicinal Chemistry Symposium at the XXIV IUPAC Congress (Hamburg, September 1973) would be Polypeptides: Hormone Releasing Agents. There would be 4 major papers. Short papers on the same theme were being solicited to make a full-day meeting. Although this Symposium was part of the overall Congress, Prof. SCHULTE expressed some concern about the finances and requested that the organizers of the Congress be reminded that some subvention was expected.

Prof. ARIËNS emphasized that the Section should maintain its interest in sponsoring scientific meetings. Criteria should continue to be high quality, no financial burden to IUPAC, and proper timing. However, he reported that the present Committee was not functioning effectively—all moves had to be taken unilaterally. After discussion, it was agreed to reconstitute the Committee to consist of three Members, namely, the Section's Chairman and

Secretary and Prof. ARIËNS. All suggestions for meetings should be referred to this Committee, which would obtain expert opinion on any given subject prior to making a recommendation. Prof. CAMPAIGNE would notify the Members of the now defunct Committee of this action.

### **Committee on Education**

Prof. NAUTA, representing the Committee on Education of Medicinal Chemists, spoke on the status of the Committee's report. The ensuing discussion emphasized the fact that there was still no generally acceptable definition of a medicinal chemist. In trying to decide on the final form the document should take and its ultimate distribution, it became clear that the report was not yet finished. For example, Prof. NAUTA objected to the exclusion of an important part of the material from Netherlands; there was no report from Canada and Israel; the report lacked a conclusion; it required editing.

The Members recommended that the word 'graduate' be inserted before 'education' on page 1, line 2 and that Question XVII, on page 32, be expanded to read 'Discussion, definitions and scope of the term Medicinal Chemistry or alternate terms which fit the definition on page 2 used in your country'.

It was agreed that the report was extremely valuable and should be widely distributed. However, it was not quite ready. It was voted to have the Secretary send copies of the report (with the recommended changes on pages 1 and 32) to all Committee Members with a request that they return them to Prof. E. E. SMISSMAN, suitably annotated and corrected, with recommendations as to how the Members would like to see the report in its final form. Prof. CAMPAIGNE would contact Prof. SMISSMAN with a request that he undertake this final task.

### **New Business**

In a general discussion on the current high rate of unemployment of chemists it was suggested that a contributing factor might be the tremendous increase in required biological and toxicological data by government regulatory agencies. Thus, fewer new chemical substances could be evaluated as potential drugs—hence fewer chemists were needed. It also required an increase in the number of staff biologists with a concomitant decrease in the number of chemists (because of budgetary considerations). Part of the problem might stem from competition among regulatory agencies of different countries in imposing new assignments. The Section deplored this situation and went on record as opposing undue duplication of tests in different countries and the tendency to increase unreasonably requirements for drug acceptance.

### **Election of Members**

The Titular Members (in closed session) approved of the following election procedure. In line with Section rules which required solicitation of nominations for membership at least 4 months prior to holding an election, some time during the coming weeks the Secretary would solicit nominations from the Titular Members, Associate Members, and Correspondents. Each category would be approached with an appropriate, but different, circular letter. No sooner than 4 months after the solicitation, the Section Officers would prepare a ballot, designed to provide continuity by the election of 8 Titular Members and up to 8 Associate Members. The election would be



conducted by the Secretary through a secret postal ballot and the results made known at the next Section meeting.

A. I. RACHLIN

## APPENDICES TO IUPAC INFORMATION BULLETIN

The following Appendices were issued in November 1972:

### *Appendices on Tentative Nomenclature, Symbols, Units, and Standards*

- No. 26 Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis—II. Terms and Symbols related to Analytical Functions and their Figures of Merit (Commission on Spectrochemical and Other Optical Procedures for Analysis)
- No. 27 Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis—III. Analytical Flame Spectroscopy and Associated Procedures (Commission on Spectrochemical and Other Optical Procedures for Analysis)
- No. 28 Electrochemical Definitions and Symbols (Commission on Electrochemistry)
- No. 29 Nomenclature of Regular Single-strand Organic Polymers (Commission on Macromolecular Nomenclature)

### *Technical Report*

- No. 6 Collaborative Study of the Stability of Aflatoxin M<sub>1</sub> Standards (Commission on Food Contaminants)

Subscribers to the *Information Bulletin* receive all Appendices automatically and free-of-charge on publication. Gratis copies may also be obtained by writing to:

Assistant Secretary (Publications)  
IUPAC Secretariat  
Bank Court Chambers  
2-3 Pound Way  
Cowley Centre  
Oxford OX4 3YF, UK

For Appendices issued in February 1972 and in June 1972, see *Information Bulletin* Nos. 42/43 (July 1972, page 76). Tentative Nomenclature Appendices Nos. 1-13 and Technical Reports Nos. 3-5 are now out of print.

## THE CHARTER OF THE BOOK

The Charter is a declaration of the principles which should guide the treatment of books, both nationally and internationally. It has been adopted by the international professional organizations of authors, publishers, librarians, booksellers, and documentalists. These organizations, in association with UNESCO, desire with this declaration to affirm, on the occasion of International Book Year 1972, that books, as well as related materials, should be accorded a position commensurate with the vital role they play in promoting individual fulfilment, social and economic progress, international understanding and peace. They have invited other international as well as regional and national organizations to associate themselves with this Charter.

At its meeting in London on 21 April 1972, the IUPAC Committee on Publications recommended that the Union should support the Charter of the Book. Official endorsement of that recommendation was subsequently conveyed by letter from Prof. J. BÉNARD, President of IUPAC, to the UNESCO Office of Free Flow of Information and International Exchanges.

### CHARTER OF THE BOOK

#### Preamble

*Convinced* that books remain essential tools for preserving and diffusing the world's storehouse of knowledge;

*Believing* that the role of books can be reinforced by the adoption of policies designed to encourage the widest possible use of the printed word;

*Recalling* that the Constitution of the United Nations Educational, Scientific and Cultural Organization calls for the promotion of 'the free flow of ideas by word and image' as well as 'international co-operation calculated to give the people of all countries access to the printed and published materials produced by any of them';

*Recalling further* that the General Conference of UNESCO has affirmed that books 'perform a fundamental function in the realization of UNESCO's objectives, namely peace, development, the promotion of human rights, and the campaign against racialism and colonialism';

*Considering* that the General Conference of UNESCO has proclaimed 1972 International Book Year, with the theme 'Books for All';

the

International Community of Booksellers Associations  
International Confederation of Societies of Authors and Composers  
International Federation for Documentation  
International Federation of Library Associations  
International Federation of Translators  
International PEN

## International Publishers Association

*Adopt unanimously this Charter of the Book, and call upon all concerned to give effect to the principles here enunciated.*

### **Article I**

#### *Everyone has the right to read*

Society has an obligation to ensure that everyone has an opportunity to enjoy the benefit of reading. Since vast portions of the world's population are deprived of access to books by inability to read, governments have the responsibility of helping to obliterate the scourge of illiteracy. They should encourage provision of the printed materials needed to build and maintain the skill of reading. Bilateral and multilateral assistance should be made available, as required, to the book professions. The producers and distributors of books, for their part, have the obligation to ensure that the ideas and information thus conveyed continue to meet the changing needs of the reader and of society as a whole.

### **Article II**

#### *Books are essential to education*

In an era of revolutionary changes in education and far reaching programmes for expanded school enrolment, planning is required to ensure an adequate textbook component for the development of educational systems. The quality and content of educational books need constant improvement in all countries of the world. Regional production can assist national publishers in meeting requirements for textbooks as well as for general educational reading materials which are particularly needed in school libraries and literacy programmes.

### **Article III**

#### *Society has a special obligation to establish the conditions in which authors can exercise their creative role*

The Universal Declaration of Human Rights states that 'everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author'. This protection should be also extended to translators, whose work opens the horizons of a book beyond linguistic frontiers, thus providing an essential link between authors and a wider public. All countries have the right to express their cultural individuality and in so doing preserve the diversity essential to civilization. Accordingly they should encourage authors in their creative role and should through translation provide wider access to the riches contained in the literature of other languages, including those of limited diffusion.



#### **Article IV**

##### *A sound publishing industry is essential to national development*

In a world in which there are sharp disparities in book production, with many countries lacking adequate reading materials, it is necessary to plan for the development of national publishing. This requires national initiative and, where necessary, international co-operation to help create the infrastructure needed. The development of publishing industries also entails integration with education and economic and social planning; the participation of professional organizations, extending in so far as possible across the entire book community through institutions such as national book development councils; and longterm, low interest financing on a national, bilateral or multilateral basis.

#### **Article V**

##### *Book manufacturing facilities are necessary to the development of publishing*

In their economic policies, governments should ensure that necessary supplies and equipment are available for the development of an infrastructure for book manufacture, including paper, printing and binding machinery. The maximum use of national resources, together with eased importation of these supplies and equipment, will promote the production of inexpensive and attractive reading materials. Urgent attention should also be given to the development of transcriptions of oral languages. Those concerned with the manufacture of books should maintain the highest practicable standards of production and design. Particular efforts should be made for the manufacture of books for the handicapped.

#### **Article VI**

##### *Booksellers provide a fundamental service as a link between publishers and the reading public*

In the forefront of efforts to promote the reading habit, booksellers have both cultural and educational responsibilities. They play a vital role in ensuring that an adequate and well chosen range of books reaches the reading public. Special book post and air freight rates, payment facilities, and other financial incentives aid them in carrying out this function.

#### **Article VII**

##### *Libraries are national resources for the transfer of information and knowledge, for the enjoyment of wisdom and beauty*

Libraries occupy a central position in the distribution of books. They are often the most effective means of getting printed matter to the reader. As a public service, they promote reading which, in turn, advances individual well being, lifelong education, and econ-

omic and social progress. Library services should correspond to each nation's potentialities and needs. Not only in cities, but especially in the vast rural areas which frequently lack book supplies, each school and each community should possess at least one library with qualified staff and an adequate book budget. Libraries are also essential for higher education and scholarly requirements. The development of national library networks will enable readers everywhere to have access to book resources.

### **Article VIII**

*Documentation serves books by preserving and making available essential background material*

Scientific, technical, and other specialized books require adequate documentation services. Accordingly, such services should be developed, with the assistance of governments and all elements of the book community. In order that maximum information materials may be available at all times, measures should be taken to encourage the freest possible circulation across frontiers of these essential tools.

### **Article IX**

*Free flow of books between countries is an essential supplement to national supplies and promotes international understanding*

To enable all to share in the world's creativity, the unhampered flow of books is vital. Obstacles such as tariffs and taxes can be eliminated through widespread application of UNESCO agreements and other international recommendations and treaties. Licenses and foreign currency for the purchase of books and the raw materials for book making should be accorded generally, and internal taxes and other restraints on trade in books reduced to a minimum.

### **Article X**

*Books serve international understanding and peaceful cooperation*

'Since wars begin in the minds of men', the UNESCO Constitution states 'it is in the minds of men that the defences of peace must be constructed'. Books constitute one of the major defences of peace because of their enormous influence in creating an intellectual climate of friendship and mutual understanding. All those concerned have an obligation to ensure that the content of books promotes individual fulfilment, social and economic progress, international understanding and peace.

Approved at Brussels  
22 October 1971  
by the Support Committee for  
International Book Year

## REPORTS OF IUPAC-SPONSORED SYMPOSIA

### SYMPOSIUM ON MAN-MADE POLYMERS IN PAPERMAKING

Helsinki, 5-8 June 1972

The Symposium was sponsored by IUPAC and EUCEPA (Comité Européen de Liaison pour la Cellulose et le Papier), and was attended by about 580 scientists representing 28 countries. It was organized jointly by the Finnish Paper Engineers' Association and the Finnish Pulp and Paper Research Institute, and was the third IUPAC-EUCEPA Symposium held in Finland. The two previous symposia were on Dissolving Pulps (1966) and on Recovery of Pulping Chemicals (1968).

The opening ceremony and all the lectures were held in the completely new Finlandia House, the municipal congress and concert hall of Helsinki designed by the famous Finnish architect ALVAR AALTO. The facilities offered a proper blend of working atmosphere and comfortable surroundings. An international exhibition was also arranged in Finlandia House: items on display included plastic and chemical products, fibre and other raw materials, and equipment employed in the manufacture of paper and nonwovens. Apart from the technical programme, various social and cultural events were arranged to provide those taking part with opportunities to get acquainted with each other, and familiarize themselves with the Finnish way of life. A cocktail reception was offered by the Mayor of the City of Helsinki.

From the opening ceremony, one remembers in particular the opening lecture by A. H. NISSAN (USA) on *Symbiosis of Polymers and Paper*. It was a most vivid review of the Symposium background, introducing plastics as a powerful newcomer to the field of paper substrates. The following conclusions were drawn by Mr. NISSAN. Because paper can contribute its peculiar properties to synthetic polymers in a measure equal to the contribution made to papers by synthetic polymers, the pessimistic view which pictured the replacement of traditional paper with synthetics could be rejected. For the next few decades, both petrochemical polymers and cellulosic-based paper would probably increase in use. While competition between them would continue, nevertheless their joint use would result in greater growth for both than their competition would diminish the use of either. Properties determined value. Except for the property of chemical composition, it was ultimately possible to match any useful property, or combination of useful properties, of any grade of paper by a properly designed sheet of synthetic polymers. Except for the property of purity, it was more efficient to obtain a given set of properties by combining materials than by using pure substances singly.

Within its short lifespan, plastic had become the foundation for a large number of products, many of them marketed by the paper, board, and graphic arts industry. The symbiosis of polymers and paper was a fact today, although the innovations introduced had given rise to a number of new problems in conjunction with many processing steps, machine design, and converting. The Symposium was aimed at shedding light on and providing opportunities for discussion of as much as possible of the knowledge disclosed in relation to:



- (i) Application of synthetic resins in stock preparation (programme section No. 1)
- (ii) Webs of man-made fibres (programme section No. 2)
- (iii) Manufacture and properties of synthetic, paperlike films (programme section No. 3)

The 9 papers in Section 1 of the programme were concerned with different effects of synthetic resins when added to a pulp suspension. The science and the applications of chemical additives in papermaking were discussed by J. W. SWANSON (USA) and R. SKOGMAN (Finland), respectively. The lectures of R. MCD. BARRETT (UK) and G. GUIROY (France) were concerned with the wet strength of paper. Other papers dealt with new bonding systems for paper (G. G. ALLAN, USA), the coagulation of polymer dispersions in conjunction with stock preparation (F. MATEJCEK, Germany), retention problems (K. E. ELMIN, Sweden), and the use of so-called synthetic pulp in papermaking (M. OSTERRIETH, Italy, and J. S. BARTON, USA). The latter two lectures aroused a great deal of interest and led to a very long discussion. Synthetic high density polyethylene pulps were in the early development stages, making it extremely difficult to foresee the significance of these materials. However, according to some observers in this area, the prospects gave reason for a great deal of optimism.

The session on webs of man-made fibres was of particular interest to the manufacturers of nonwovens and synthetic fibre reinforced paper; the papers dealt principally with new man-made fibre raw materials and critical aspects of the application of man-made fibres in wet-laid paper-making processes. Eleven papers were presented in this section of the programme. G. A. M. BUTTERWORTH (USA), A. DINKEL (Germany), T. ASHIKAGA (Japan), and K. E. PEREPELKIN (USSR) dealt with fibre raw materials, whereas L. GÖTTSCHEG (Germany), D. WAHREN (Sweden), L. NORDMAN (Finland), and E. BÖHMER (Norway) discussed various aspects of wet-laying and web treatment. R. KRČMA (Czechoslovakia), J. W. S. HEARLE (UK), and H. JÖRDER (Germany) discussed the structure, properties, and bonding of nonwoven materials. In these papers, examination was made of the problems related to the manufacture of both dry- and wet-laid structures.

The third session of the Symposium began with a general survey of those materials, including a survey of the reasons for the advent of synthetic or plastic paper (R. W. WRIGHT, USA). The other 7 papers in this section were mainly concerned with the following subjects: correlation between the properties of the end product and the raw material used; printability of polyethylene and polystyrene paper films and means for its improvement; manufacturing techniques for high density polyethylene paperlike films. Many advances were being made in this area and efforts to develop new techniques were in progress. Nevertheless, it was obvious that a great deal of research was still necessary for the elimination of some disadvantages of synthetic papers and improvement in manufacturing techniques.

In the closing session, presentations were made of trends in the fields concerned. Future trends of synthetic paper (techno-economic considerations) were discussed by V. M. WOLPERT (UK), while J. W. SCHAPPEL (USA) spoke on current and future trends in nonwoven development. In the technological field, it was expected that the production costs of synthetic and plastic paper would be reduced by the introduction of special production processes, improved types of special grades of polymer, and plants with a higher output. Although synthetics and plastics presented growing competition to conven-

tional papers, it should be stressed that new prospects for the paper industry were opened up by the use of synthetic polymers in combination with conventional products. However, the challenges that faced the nonwoven industry were the manufacture of products that fully resembled textiles in their characteristics, without resort to the complexities of knitted and woven products, the development of nonwovens with greater utility than that to be found in regular textiles, the incorporation of properties such as flame retardancy and disposability, and the achievement of these objectives by means of processes that were financially attractive.

The full papers presented at the meeting, including the recorded discussions, were to be printed in a special book, which was expected to be available early in 1973.

In conjunction with the Symposium, tours were made to Finnish paper mills, paper and board converting plants, a new polymer plant, and to a manufacturer of equipment for polymer processing. More than 300 delegates participated in these mill tours.

L. NEIMO

## **MICROSYMPOSIUM ON PHOTOCHEMICAL PROCESSES IN POLYMER CHEMISTRY**

**Leuven, 12-15 June 1972**

The Symposium, under the auspices of IUPAC and sponsored by Koninklijke Academie voor Wetenschappen, Letteren en Schone Kunsten van België, and by the Ministry of Education, was held at the University of Leuven. From the 104 attendants, 60 came from abroad representing 12 countries.

Three plenary lectures covering general aspects of photochemistry and 8 main lectures covering different aspects of photochemistry as related to polymer formation, transformation, and polymer properties, were presented. After some welcoming remarks by Prof. H. BENOIT, Honorary Chairman of the Symposium and official representative of IUPAC, and by Prof. G. SMETS, Chairman of the Symposium, a lecture on the primary photophysical processes was given by Prof. TH. FÖRSTER (Germany). In this lecture the relation between photophysics and photochemistry was stressed. The importance of primary processes in polymeric substances was brought forward by Dr. R. FOX (USA) in his talk on fluorescence and phosphorescence in polymers. The analogy between primary processes in polymeric materials and in matrices was pointed out by Prof. J. JOUSSOT-DUBIEN (France). Photo-initiation by radical species derived from organometallic compounds was discussed by Prof. C. H. BAMFORD (UK). Ionic polymerization, initiated by photolytically formed ion radicals, was the topic discussed by Profs. S. TAZUKE and K. HAYASHI (Japan).

New synthetic possibilities in the field of organic photochemistry were presented by Prof. D. BRYCE-SMITH (UK). Prof. R. C. SCHULZ (Germany) discussed the application of organic photochemistry to polymer systems in his talk on phototransformation of polymers. The possible application of organic photochemistry in photopolycondensation reactions was the subject of a lecture held by Prof. F. C. DE SCHRYVER (Belgium). The problem of energy transfer and the photochemistry of synthetic and natural biopolymers was discussed by Dr. A. LAMOLA (USA). The photodegradation of polymers was compared with thermal degradation and their importance was stressed by Prof. N. GRASSIE (UK).

The plenary and main lectures of this meeting, which brought together people active in photochemistry and in polymer chemistry, were to be published in the official journal of IUPAC, *Pure and Applied Chemistry* (scheduled Vol. 34, No. 2, 1973).

F. C. DE SCHRYVER

## **VIII INTERNATIONAL CONGRESS ON CLINICAL CHEMISTRY**

**Copenhagen, 18-23 June 1972**

The Congress was sponsored by IFCC and by IUPAC at Bella Centret in Copenhagen. The Scandinavian Society for Clinical Chemistry and Clinical Physiology issued the invitation and the Danish Society for Clinical Chemistry organized the Congress. The President was POUL ASTRUP.

Some 1,890 persons were registered as active members, but 85 persons did not arrive. In addition, 515 persons were registered as associate members and approximately 200 persons participated as 'one day' members.

The scientific programme consisted of 22 symposia with invited speakers and 30 sections with contributed papers. A total of 524 papers was presented. The abstract book (220 pages) is still obtainable from the Congress Secretariat: no proceedings would be issued.

The technical exhibition and the auditoria were placed under one roof, and in between there was a walking street with restaurants, *etc.*, and a lounge. The exhibition had 122 exhibitors representing 350 firms. The nett stand area was 3,636 m<sup>2</sup>. In addition to the Congress members, the exhibition was visited by 3,000 guests.

A manuscript copy service was established during the congress, and 317 speakers delivered manuscripts for this purpose: altogether 7,000 copies were ordered by the Congress members. By courtesy of Rank Xerox A/S the copy work was supplied free of charge.

Some 256 members participated in the programme for visiting departments of clinical chemistry in Copenhagen.

The opening ceremony was attended by 1,600 persons. The social events covered Copenhagen excursions, a North Zealand excursion with dinner dance in Elsinore, receptions at the various town halls, and a Tivoli evening. The childrens' excursion programme was attended by 26 children.

Several international bodies held meetings in conjunction with the Congress.

A. ULDALL

## **XIV INTERNATIONAL CONFERENCE ON COORDINATION CHEMISTRY**

**Toronto, 22-28 June 1972**

This was the first time an ICCS had been held in Canada and only the second time on the North American continent, the VI ICCS having been held in Detroit in 1961.

The Conference was attended by over 800 delegates, somewhat more than had been anticipated; in all some 35 countries were represented. The 16 different symposium topics contained 160 contributed papers, 23 section



lectures, and 9 plenary lectures\*. An unusual event was the staggering of the section lectures so that all might be attended if the delegates so desired. In view of the large number of papers submitted (timetabling commitments allowed only about half of these to be read), contributed papers were of a particularly high calibre.

Highlights of some of the areas discussed included plenary lectures by R. MASON (UK), P. M. MAITLIS (Canada), and F. CALDERAZZO (Italy) dealing with aspects of organometallic chemistry, with emphasis on catalysis, an area stressed by J. HALPERN (USA) in his section lecture. Kinetic and mechanistic aspects of coordination chemistry were well represented by such experts as R. G. WILKINS (USA), A. M. SARGESON (Australia), L. CATTALINI (Italy), D. A. BUCKINGHAM (Australia), K. B. YATZIMIRSKII (USSR), A. J. POÉ (Canada), and many others. The dominant role played by preparative chemistry was illustrated by such masters as M. F. HAWTHORNE (USA), who dealt with his fascinating work on metal carborane systems, J. P. COLLMAN (USA) dealing with new preparative routes, D. H. BUSCH (USA) a world authority on macrocyclic compounds, and J. LEWIS (UK), W. A. G. GRAHAM (Canada), L. F. DAHL (USA), B. JEZOWSKI-TRZEBIATOWSKA (Poland), L. SACCONI (Italy), J. G. NOLTES (Netherlands), D. C. BRADLEY (UK) and many, many others. Utilization of synthetic methods also played a large part in the proceedings with contributions dealing with NMR spectroscopy by D. R. EATON (Canada), with photoelectron spectroscopy by D. C. FROST (Canada), magnetic circular dichroism by P. N. SCHATZ (USA) and many other contributions in these fields and others, including presentations by M. BIGORGNE (France), I. BERTINI (Italy), A. MÜLLER (Germany), E. KÖNIG (Germany), T. M. DUNN (USA), H. KOBAYASHI (Japan), *etc.* Thermodynamic aspects were well covered by such leaders as V. GUTMANN (Austria) and S. ÅHRLAND (Sweden); electrochemistry similarly by A. A. VLČEK (Czechoslovakia), R. DESSY (USA), *etc.*

The rapidly growing area of bioinorganic chemistry was well represented with discussions including vitamin B<sub>12</sub> and its models by G. M. SCHRAUZER (USA), bacterial iron sulphur proteins by J. A. IBERS (USA), and R. H. HOLM (USA) and spectral probes of metal enzymes by B. L. VALLEE (USA) among many other topics. Photochemistry and optical activity continued to maintain strong interest with presentations by A. W. ADAMSON (USA), Y. SAITO (Japan), V. BALZANI (Italy), and C. H. LANGFORD (Canada), amongst others.

The Conference also paid tribute to the memory of one of the great leaders in coordination chemistry who so tragically passed away last year. The Sir RONALD NYHOLM Symposium opened with a memorial lecture by J. CHATT (UK) and contained papers contributed by his many colleagues. The breadth of chemistry represented within this symposium was in itself a fitting memorial to the impact that one man alone had on the subject.

A. B. P. LEVER

**INTERNATIONAL SYMPOSIUM ON  
MACROMOLECULES  
Helsinki, 2-7 July 1972**

This year a macromolecular meeting was arranged for the first time in Fin-

\*The plenary lectures are scheduled for publication in *Pure Appl. Chem.*, 33 (4), (1973).

land under the auspices of the Macromolecular Division of IUPAC and in collaboration with the Society of Finnish Chemists and the Central Organization of Finnish Chemical Industries.

IUPAC meetings on macromolecular chemistry had grown tremendously in size during their 25 years of existence and so also the matter presented and treated during the 5 days of active conference. Held at Finlandia House, the Helsinki meeting went down in history as medium in size. Nevertheless, 26 plenary lectures\*, 340 deliverers of short communications, and about 840 participants from 33 countries gave a deep insight into what was currently going on in the macromolecular field.

Because of the very diverse topics discussed—theoretical polymer chemistry, polymerization reactions and new polymers, solid state, solution and bulk properties of polymers, polymer degradation and polysaccharides—the representation was really heterogeneous but also profitable, as experts from different areas got together to discuss each other's problems and to gain from their experiences. Owing to the large extent of the material presented, only a few examples are given here together with a short summary emphasizing some general lines of the discussions.

Thermodynamics and statistics had always been the theoretical fundamentals of polymer chemistry. The discussions during the meeting showed that this was still true and that the central questions concerning excluded volume effects and virial coefficients were as actual problems as ever. Thus, Prof. P. J. FLORY (USA) pointed out that the body of evidence was compelling to the effect that the configurations of macromolecular chains in amorphous bulk polymers were random, and that they differed imperceptibly from the configurations occurring at infinite dilution (apart from the effect of excluded volume in dilute media). The bundle, micelle, and mesomorphic models so often advocated for bulk polymers would require the optical anisotropy to be at least of an order of magnitude greater than observed. The concatenation of units comprising the polymer chain evidently did not of itself greatly enhance intermolecular correlations in the amorphous state.

Prof. M. L. HUGGINS (USA) presented the main parts of his theory of polymer solutions and pointed out the relationships derived for the concentration dependence of the enthalpic and entropic parts of the interaction parameter  $\chi$ . Theoretical equations were illustrated by selected experimental data. With the aid of experimental material Prof. W. H. STOCKMAYER (USA) showed the competition between local and collective modes of motion for polystyrene and its derivatives and applied the theory of Kramers to the problem. The thermodynamics of multicomponent polymer systems was discussed by Prof. R. KONINGSVELD (Netherlands), giving a method for the accurate determination of the dependence of the free enthalpy on temperature, concentration, and molecular weight distribution. The treatment was not limited to any particular molecular model, provided that the free enthalpy could be written in the form of the Flory-Huggins combinational entropy terms plus an arbitrary correction function for concentration, temperature, and molecular weight distributions.

Only fifteen years ago, it was stated that all the commercial polymers needed for mankind had been explored and it only remained to reinforce and improve their properties. The demands of space science, of the atomic energy industry, and of underwater activities had completely changed this

\*Scheduled for publication in a supplementary volume to the IUPAC journal *Pure and Applied Chemistry*.



picture and put to shame the futurologists of those times. These new views were well reflected in numerous papers presented at the Symposium. Prof. H. MARK (USA) summarized the most important elements in the progress of making new polymers for new uses as follows: the use of very rapid polymerization processes for the direct conversion of monomers into polymeric fibres, films, and webs; the synthesis of very high molecular weight polymers which had a narrow molecular weight distribution; the preparation of polymers which had rigid chains and the development of methods for their practical conversion into useful products; first steps to make composite systems with organic polymers which had unusual electrical and magnetic properties and the preparation of synthetics which could be applied in many areas of biology, physiology, and medicine. A selection of representative cases in these areas of recent progress was also presented in the lecture. In connection with the above mentioned theme, Prof. J. K. STILLE (USA) presented a series of new methods for synthesis of high temperature macromolecules by polyelectrocyclization and formation of polyquinoxalines with various groups introduced into the chain.

A great number of papers were also devoted to reaction mechanisms. Thus, Prof. P. H. PLESCH (UK) discussed developments in the theory of cationic polymerization and especially the initiation by aluminium halides, whereas Prof. J. P. KENNEDY (USA) discussed alkylaluminium compounds in carbenium ion polymerization, to give some examples.

In recent years there had been great progress in our understanding of solid state polymer properties and especially in the understanding of polymer materials under high yield stress and in breaking down. In his lecture on these subjects Prof. A. PETERLIN (USA) showed that in composite structures of crystals imbedded in a pseudo rubbery amorphous matrix, the main factors determining the mechanical properties of the crystalline polymer solid were much more important than the crystal defects. As a consequence of rejected impurity concentration on the boundaries between adjacent stacks and between spherulites which were bridged by very few tie molecules, they could be easily sheared and rotated and by lamella destruction transformed into the fibrous structure. The material connection by tie molecules was interrupted at the ends of microfibrils which acted as point defects of the microfibrillar lattice. Upon loading they opened as microcracks which by radical and/or axial coalescence could grow to critical size, leading to catastrophic crack propagation and sample failure. The relation between mechanical stress and optical properties of polymeric materials containing photochromic groups was discussed by Prof. G. SMETS (Belgium). An explanation of the relation between glass-point and viscosity was given in terms of the well known WLF-equation. The rheological properties of monodisperse polymers and their blends and solution were explained by Prof. G. V. VINOGRADOV (USSR).

The reactions of polymers under the influence of radiation received much attention. Thus, Prof. B. RÅNBY (Sweden) discussed ESR-studies on allyl monomer initiation with redox systems. Especially three types of free radical initiators ( $\text{HO}\cdot$ ,  $\text{H}_2\text{N}\cdot$  and  $\text{H}_3\text{C}\cdot$ ) from redox systems were studied and the structure, relative concentration, and steric conformations of the monomer radical intermediates were interpreted. Prof. F. TUDOS (Hungary) discussed the degradation of some industrially important polymers, such as PVC. The degradation took place according to an elimination mechanism. A model was developed for interpretation of the experimental results. According to this model, the overall decomposition reaction could be regarded as a



special zip-reaction where the initiating step was predominantly a random decomposition of monomeric units, accompanied by an initiation of higher rate occurring at the beginning of the process.

From the practical point of view the review on weathering of polyolefins by Dr. F. H. WINSLOW (USA) and the paper by Prof. G. SCOTT (UK) were of special interest. The latter reported the effect of processing on the UV-stability of polyolefins. The UV-stability was very sensitive to the severity of the processing conditions although no chemical changes could be observed. Inhibition of photooxidation by peroxide decomposing antioxidants was due at least in part to their effect during the processing operation. On the other hand, metal ions played the dual role of producing hydroperoxides and of acting as radical generators. However, certain metal complexes (Fe) could act both as antioxidants during processing and initially during UV-exposure and as initiators for degradation at the end of a controllable induction period during UV-exposure.

The last section of the symposium was devoted to polysaccharides and their derivatives. A lucid review on the present state of cellulose research and the achievements of Swedish scholars was given by Prof. S. CLAEISSON (Sweden). Especially the torsion pendulum investigation on small fibres seemed to give promising results regarding knowledge of the internal rotation of the units. A report on new methods of structure elucidation, *i.e.*, GLC and mass spectroscopy, and their possibilities in polysaccharide chemistry was given by Prof. B. LINDBERG (Sweden).

The Symposium was completed with a commemoration occasion of the distinguished polymer chemist Prof. A. KATCHALSKY (Israel) who was killed in the attentate at Lydda earlier in the year.

J. J. LINDBERG

## **INTERNATIONAL SYMPOSIUM ON CHEMISTRY IN EVOLUTION AND SYSTEMATICS**

**Strasbourg, 3-8 July 1972**

The Symposium, sponsored by IUPAC and with help from Université Louis Pasteur and French and Swiss industry, was held at Université Louis Pasteur. It attracted over 100 participants from 20 different countries, including Australia, Brazil, Czechoslovakia, Israel, and Malaya. Ten plenary lectures and 19 supporting lectures were given by invited speakers and there were 29 contributed short papers. Most of the invited lectures were to be published during 1973 in the IUPAC journal, *Pure and Applied Chemistry*, and they would also be available later in book form.

The Symposium covered 5 main subject areas: Chemistry of Geographical Races; Comparative Aspects of Biosynthetic Pathways; Insect-Plant Co-evolution; Molecular Evolution in Plants; and Fossil Chemistry. In addition Prof. V. H. HEYWOOD (UK) gave a special plenary lecture on the *Role of Chemistry in Plant Systematics*, Prof. S. FOX (USA) gave a closing plenary lecture on *Molecular Evolution to the First Cell*, and there was a general session for contributed papers on Chemosystematics.

The participants were welcomed on behalf of IUPAC by Prof. A. KJAER (Copenhagen), Chairman of the initiating IUPAC Commission on Chemical Taxonomy and on behalf of Université Louis Pasteur by Prof. G. OURISSON

(Strasbourg), President of the Université and Chairman of the Organic Chemistry Division of IUPAC.

The opening plenary lecture was given by Prof. T. MABRY (USA) on *Chemistry of Geographical Races*. He outlined the current work on variation in secondary constituents which had been found in disjunct populations of several species, and described the ways in which these chemical data allowed one to probe into the origin and genetic complexity of the races. His theme was well supported by the individual examples which were presented by the three discussants (Dr. R. H. FLAKE, USA; Dr. E. ZAVARIN, USA; and Dr. E. VON RUDOLFF, Canada) and the contributed papers. One interesting paper (Dr. E. SMALL, Canada) concerned the variation in cannabinoids in 350 diverse acquisitions of *Cannabis sativa*; plants from most populations north of latitude 30°N were virtually free from  $\Delta^9$ -tetrahydrocannabinol unlike their southern counterparts.

The special plenary lecture by Prof. HEYWOOD pointed out that chemical data could be of exceptional value in suggesting acceptable classifications of plant taxa in particular cases although, at present, one could not predict these in advance. However, in spite of many claims to the contrary, chemical characters could not be regarded as being 'privileged' and were adjuncts to, rather than superseded morphological data. Much needed to be done to solve the handling and presentation of chemical data before it could easily be used in the study of systematic problems.

The second full session opened with a plenary lecture on *Comparative Biosynthesis of Microbial Secondary Metabolites* by Dr. J. D. BU'LOCK (UK) who pointed out the need to examine biosynthetic pathways in depth, studying not only the origin of the atoms in the final natural product, but also the enzymology and phenotypic regulation, thus leading to characterization of the genotype itself. He illustrated the progress made with examples taken from the mevalonic acid pathway to sterols, carotenoids, prenols, and the fungal sex hormones, the trisporic acids. From these examples he demonstrated the phylogenetic insight one could derive from comparative studies, and some of the still unsolved problems even when working with the 'deceptively simple' fungi. This was amplified by the first discussant (Dr. Z. VANĚK, Czechoslovakia) who described attempts to determine the controlling mechanisms in the biosynthesis of tetracycline by *Streptomyces aureofaciens*. The second discussant (Prof. R. THOMAS, UK) described the variation between fungi and plants in their mode of biosynthesis of the structurally fascinating phenalenones. It would be interesting to know whether the function of these substances was the same in the two groups of organism. The level of interest in comparative aspects of biosynthesis, including its regulation, was maintained in the contributed papers.

The second half of this session opened with a plenary lecture by Prof. H. GRISEBACH (Germany) on *Comparative Biosynthetic Pathways in Higher Plants*. Again, Prof. GRISEBACH stressed the need to examine the enzymological and control aspects of pathways as well as the comparative ones. He pointed out the variation in the routes of biosynthesis between different organisms needed to be taken into account, illustrating the point with examples from the naphtho- and anthra-quinones. The recent advances in the enzymology of flavonoid biosynthesis, work mainly done in his own Institute, provided the perfect illustration of the magnitude of the problem. He pointed out that when one knew more about the enzymes concerned in biosynthesis and their mode of regulation, one would be more easily able to solve problems in systematics and evolution. The two discussants (Prof.



M. H. ZENK, Germany on *Biosynthetic Routes to Naphthoquinones* and Prof. W. BARZ, Germany on *Comparative Aspects of Catabolic Pathways*) gave full support to the plenary speaker's contentions. Both talks were models of clarity and filled with information and useful generalizations and the same high standard was maintained in the contributed papers.

The third session was opened by a plenary lecture on *Plant Fitness and Secondary Compounds* by Prof. D. H. JANZEN (USA) who started with the contentious statement that 'the primary role of secondary substance in plants is defense against herbivores'. By the time he had finished his sparkling dissertation, selecting examples from his own work on the susceptibility of legume seeds to attack by insects and the protective action of nonprotein amino acids and from many other sources, he had convinced many of the audience that his statement might be right. Prof. P. FEENY (USA) on *Insect-Plant Coevolution* and Prof. A. E. BELL (USA) with a paper of the same title gave plenty of support. Both showed the importance of secondary products, nonprotein amino acids, on the development of the phytophagous insects which ingested them.

The fourth session on *Molecular Evolution in Plants* started with a model presentation of the *Molecular Evolution of Higher Plant Cytochrome c* by Prof. D. BOULTER (UK), in which he outlined the work done in his own laboratory on the determination of the amino acid sequences of twenty higher plant cytochromes *c*. The technical difficulties of this mammoth task were outlined and the methods used to construct phylogenetic trees from the data, using both the ancestral sequence method and the flexible numerical matrix method, given. The most probable tree calculated from the data proved to be quite different from the accepted phylogeny of the angiosperms which had been put forward mainly on morphological grounds and, as the lecturer pointed out, this showed the need for a more flexible approach to the origin and evolution of higher plants. Equally fascinating lectures on comparative amino acid sequences and serological studies on proteins came from the three supporting speakers (Dr. R. P. AMBLER, UK, *Protein Structure and the Phylogeny of Simple Organisms*; Dr. D. O. HALL, UK, *Evolution of Ferredoxins from Primitive Life to Higher Organisms*; and Prof. U. JENSEN, Germany, *Significance of Serological Methods revealing Molecular Evolution of Plant Proteins*). The contributed papers rounded off an informative and interesting first half of the session.

The second part of the session was opened with a plenary lecture by Prof. U. E. LOENING (UK), who ranged over the variation in both DNA and RNA between and within the major phyla, and discussed the similarities and differences between the nucleic acid complement of eucaryotic organelles (mitochondria and chloroplasts) and those of procaryotic cells. The function of repeated units of DNA in the nuclear DNA of eucaryotes and its possible relation to control mechanisms was also outlined and the evolutionary changes which appeared to have come about since the early primitive procaryotic cell were discussed. The variation in DNA/RNA hybridization and the structure and sequence of ribosomal RNA in relation to protein synthesis was also stressed. The importance of the reiterated rRNA genes was exemplified by the discussant Prof. F. AMALDI (Italy) on the *Numerical Evolution of rRNA Genes*.

The final session on *Fossil Chemistry* should have opened with a plenary lecture by Dr. M. BLUMER (USA), who unfortunately was unable to attend. His place was ably filled, however, by an excellent extempore introduction on the *Problems and Methods of Fossil Chemistry* by Dr. G. EGLINTON (UK).



The three discussants gave detailed examples of the difficulties in assigning origins to chemical fossils in petroleum. Dr. B. TISSOT (France) and Dr. B. M. VAN DER WEIDE (France) dealt with diagenesis of organic matter in sedimentary rocks of oil-bearing strata with particular reference to the large variation in the rates at which change took place depending on the geological history and on the class of compound under investigation. Dr. W. K. SEIFERT (USA) outlined experiments designed to uncover the origin of the steroid acids from petrol.

In the second half of the session Dr. EGLINTON gave his own plenary lecture on *Fossil Chemistry*. He described in more detail the advantages and disadvantages of several new methods of analysis including ion microprobe,  $^{13}\text{C}$  NMR, and computer assisted mass spectrometry. He described in some detail experiments currently being carried on in his laboratory on the breakdown of  $^{14}\text{C}$ -labelled compounds in surface muds of fresh water lakes and marine estuaries which pointed to the extensive changes which might happen during the near-surface decomposition of organic matter. He also reviewed the organic compounds obtained from ocean cores and discussed the need for construction of suitable models to assist in interpreting the results. His colleague, Dr. J. R. MAXWELL (UK), and Dr. P. ALBRECHT (France) outlined recent work on *Acyclic Isoprenoid Compounds from Geological Sources* and *Triterpenes in Oil Shale*, respectively, in a masterly way.

The last plenary lecture was the special one by Prof. Fox mentioned earlier. He outlined the probable steps leading to the molecular evolution of the first cell starting from the synthesis of amino acids (and other cellular metabolites) from simple starting materials, pointing out that such processes were continuing to take place in interstellar space. Heating mixtures of amino acids above the boiling point of water produced proteinoids which possessed weak but discernible enzyme activities. In water these formed micro systems with many cell-like properties, including double membrane systems, cellular replication by budding, binary fission, sporulation or parturient proliferation. Other properties of the proteinoids and the protocells imitated primitive behavioral and informational states. The lecture was illustrated by a fascinating film of protocell movement and division.

The final session of the Symposium was devoted to contributed papers all of a uniformly high standard. Prof. V. HEROUT (Czechoslovakia) gave a particularly interesting account of the use of sesquiterpenoids as evolutionary markers in the *Compositae* and Dr. B. J. NIELSEN (Denmark) described the distribution of novel cyclohexadienyl glycosides in *Cornus* species.

During the course of the Symposium useful open discussions were held on the organization of chemosystematics and the needs for the future.

The whole meeting, although interdisciplinary, was noted for the almost complete attendance of all participants at every session and, when time permitted, of extremely lively discussion. No one who went to Strasbourg could fail to be enthusiastic about the need for further meetings of this type. It could certainly be judged as a pioneering effort that was entirely successful in achieving what it set out to do: to bring scientists of different disciplines together and discuss problems in evolution and systematics from a chemical viewpoint.

T. SWAIN

## IV INTERNATIONAL SYMPOSIUM ON ORGANIC PHOTOCHEMISTRY

Baden-Baden, 16-22 July 1972

This Symposium was the fourth gathering of its kind, following those held in 1964 (Strasbourg), 1967 (Enschede), and 1970 (St. Moritz). As with the preceding ones, it was sponsored by IUPAC and publication of the plenary lectures would take place in the official journal of IUPAC, *Pure and Applied Chemistry* (scheduled Vol. 33, Nos. 2-3, 1973).

The meetings were held in the Kongresshaus of Baden-Baden. The Chairman of the Organizing Committee was Prof. H. E. ZIMMERMAN (USA) and local organization was taken beautifully care of by Dr. D. DÖPP (Germany). Some 192 photochemists attended the meeting.

The scientific programme consisted of invited lectures and of discussions on shorter contributions covering all aspects of photochemistry: primary processes, kinetic spectroscopy, mechanisms of photochemical transformations, synthetic applications.

The plenary lectures were as follows:

H. HART (USA)	Photochemistry of Cycloheptadienones
W. G. DAUBEN (USA)	Steric Aspects of Photochemistry of Conjugated Dienes and Trienes
K. SCHAFFNER (Switzerland)	Recent Results on Some Photochemical Rearrangements
J. A. BARLTROP (UK)	Photochemical Reduction of Aromatic Systems
H. SCHMID (Switzerland)	Photochemistry of Some Heterocyclic Compounds
A. PADWA (USA)	Recent Advances in Photochemistry of the Carbon-Nitrogen Double Bond
L. SALEM (France)	Diradicals
K. GOLLNICK (Germany)	Direct and Sensitized Photolysis of Dimethyl Sulfoxide in Solution
A. ZWEIG (USA)	Photochemical Generation of Stable Fluorescent Compounds (Photofluorescence)
G. QUINKERT (Germany)	Photochemistry of Linearly Conjugated Cyclohexadienones in Solution
N. TURRO (USA)	Thermal and Photochemical Generation of Electronically Excited Organic Molecules: Tetramethyl-1,2-dioxetane and Naphthazulene

A total of 62 contributed papers was received and detailed abstracts of all were gathered in a book distributed to the participants at the beginning of the Symposium. From amongst these papers, 23 were selected by the Organizing Committee for short oral presentation in order to outline the most controversial or exciting portions of the material followed by a Faraday Society style discussion.

J. RIGAUDY

## VII INTERNATIONAL SYMPOSIUM ON REACTIVITY OF SOLIDS

Bristol, 17-21 July 1972

This was the first occasion on which the Symposium, which was held every

four years, had taken place in UK. It was attended by some 300 participating scientists, together with 50 accompanying members, drawn from a total of 27 nations.

The Symposium was interdisciplinary in nature and was held under the auspices of IUPAC and IUPAP and sponsored by the Chemical Society in conjunction with the Institute of Metals and the British Ceramic Society. The President of the Symposium was Prof. J. S. ANDERSON (Oxford) and the Chairman was Prof. F. S. STONE (Bath).

This series of Symposia sets out to survey broadly the whole subject of reactions of solids, as understood by scientists with differing backgrounds, and is of interest to workers in chemistry, physics, metallurgy, ceramics, geology, glass technology, *etc.* An attempt is made to crossfertilize ideas between one discipline and another. The present Symposium emphasized a number of themes which were considered timely, including defect chemistry, diffusion processes leading to reaction, the role of dislocations in solid state reactions, reactions of the organic solid state, the vitreous state, surface structure and processes, and solid state reactions in technology. The 63 contributed papers were grouped around 6 full length plenary lectures by distinguished scientists.

The proceedings of the Symposium were to be published by Chapman and Hall Ltd. (London). Preliminary arrangements for the VIII International Symposium were now in hand: it was hoped to hold it in Sweden in the Summer of 1976.

R. M. DELL

## **VI INTERNATIONAL SYMPOSIUM ON CARBOHYDRATE CHEMISTRY**

**Madison, 14-18 August 1972**

This Symposium was sponsored by IUPAC, American Chemical Society (Division of Carbohydrate Chemistry and Division of Cellulose, Wood, and Fiber Chemistry), University of Wisconsin, and the Forest Products Laboratory. Nearly 300 registrants from 21 countries participated.

Welcomes were extended to the participants on behalf of the Organizing Committee by Chairman Prof. R. L. WHISTLER; on behalf of the University of Wisconsin by G. S. POUND, Dean of the College of Agricultural and Life Sciences; on behalf of the Forest Products Laboratory by J. F. SAEMAN, Associate Director; and on behalf of IUPAC by Prof. H. ZOLLINGER.

The keynote address entitled *Carbohydrates in Our Modern Society* was delivered by R. C. LIEBENOW (USA). Eighty-five scientific papers, both invited and submitted, were presented in sections on biochemistry, cellulose, industrial carbohydrates, physical studies, organic synthesis and mechanisms, and polysaccharides. Selected sessions were held in honour of four distinguished scientists, H. S. ISBELL, W. Z. HASSID, K. WARD, and K. P. LINK. Five plenary lectures were delivered by specially invited lecturers:

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|--------------------------|--|
| S. J. ANGYAL (Australia) | Complex Formation between Sugars and Metal Ions      |
| L. RODEN (USA)           | Biosynthesis of Connective Tissue Polysaccharides    |
| F. SHAFIZADEH (USA)      | Cellulose Chemistry in Perspective and Retrospective |



- |                      |  |
|----------------------|--|
| A. G. HOLSTEIN (USA) | Changes in Carbohydrate Marketing as Affected by Research      |
| A. B. FOSTER (UK)    | Synthesis and Biological Activity of Fluorinated Carbohydrates |

The plenary lectures were to be published during 1973 in *Pure and Applied Chemistry*, official journal of IUPAC.

W. M. DOANE

## INTERNATIONAL SYMPOSIUM ON CONTROL OF MYCOTOXINS

Kungälv, Göteborg, 21-22 August 1972

This Symposium was attended by 80 active participants from 16 countries representing 4 continents. It was organized by the Food Contaminants Commission of the Food Section of IUPAC, headed by the Chairman Dr. R. MARCUSE (Sweden), and an Advisory Board consisting of Dr. A. D. CAMPBELL (USA), Dr. P. KROGH (Denmark), and Dr. I. F. H. PURCHASE (South Africa). Valuable assistance was received from the Swedish Institute for Food Preservation with support by the Swedish Board for Technical Development and the Danish Natural Science Research Council. The programme contained 30 papers, including 2 main lectures, in 3 thematic Sections:

- (i) Metabolism and biological actions
- (ii) Natural occurrence
- (iii) Methods for detection and determination

The Symposium was terminated with a panel discussion under the title of *Natural Occurrence of Mycotoxins and Control Measures by Supervising Authorities*.

The Symposium was opened by an introductory lecture presented by Dr. L. A. GOLDBLATT (USA), who, using the discovery of aflatoxins as a case history, was able to outline the problem areas which occurred and had to be solved before adequate control of mycotoxins was practicable.

The first speaker from Section (i), Dr. A. D. CAMPBELL (USA), dealt with the chemical and biological alteration of mycotoxins, especially aflatoxins. Comparative aspects of liver metabolism in relation to toxicity of aflatoxin was the topic of Dr. D. S. PATTERSON (UK). The main stress of Dr. M. A. AKHMETELI's (USSR) paper was placed on experimental study of carcinogenicity of *Fusarium sporotrichioides*. Two papers dealt with the formation of mycotoxins, such as rubratoxin (Dr. A. W. HAYES, USA), and citrinin, ochratoxin, patulin, penicillic acid, and tremortin from fungi used in sausage fermentation (Dr. M.-J. MINTZLAFF, Germany). Prof. R. O. SINNHUBER (USA) presented the rainbow trout test, a very sensitive model for determination of toxic effect of mycotoxins.

Section (ii) dealt with the important aspects of natural occurrence of mycotoxins. Dr. G. NILSSON (Sweden) treated the variation of aflatoxin content in peanut cakes. Other aspects of primary contamination were aflatoxin in pistachio nuts (Dr. R. RAHNEMA, Iran), survey on incidence of ochratoxin, aflatoxin, and zearalenone in maize (Dr. C. W. HESSELTINE, USA), ochratoxin and citrinin in cereals and patulin in apple juice (Dr.

P. M. SCOTT, Canada), zearalenone in cereals associated with disease in cattle (Dr. E. L. KORPINEN, Finland), ochratoxin and citrinin in cereals associated with disease in swine (Dr. P. K. KROGH, Denmark), and the inhibitory effect of pimaricon on toxin production (Dr. K. M. SHAHANI, USA). A new and very important aspect was the secondary contamination of food-stuffs of animal origin, which was treated by 4 speakers. Dr. P. KROGH (Denmark) reported on aflatoxin residues in swine meat, and Dr. B. HALD (Denmark) presented a report on ochratoxin residues in swine meat. Prof. F. KIERMEIER (Germany) discussed aflatoxin residues in cows' milk. This was also the main subject for Dr. I. F. H. PURCHASE (South Africa) who further dealt with new developments in detection procedures for aflatoxin M.

Section (iii) was devoted to analytical methods, and was initiated by Dr. E. HANSSEN (Germany), who treated the problem of aflatoxin control in the food industry. New methods for rapid detection of aflatoxin was the subject for Dr. C. W. HESSELTINE (USA) whereas Dr. M. JEMMALI (France) reported on collaborative studies on aflatoxin determination in peanuts in France. Dr. P. L. SCHULLER's (Netherlands) paper concerned determination of aflatoxin M<sub>1</sub> in milk, and Dr. E. L. STRZELECKI (Poland) dealt with detection of aflatoxin in meat products. Sterigmatocystin detection was discussed by Dr. W. D. KOLLER (Germany), and Dr. C. J. MIROCHA (USA) dealt with analysis of zearalenone and derivatives. Dr. H. FISCHBACH (USA) gave a report on current efforts in USA to control mycotoxins in foods, while Dr. T. TATSUNO's (Japan) paper concerned chemical and biological detection of epoxytrichothecenes from *Fusarium* species.

Finally, Dr. W. H. BUTLER (UK) gave a stimulating lecture on the toxicology of aflatoxin.

Selected papers were in course of publication in *Pure and Applied Chemistry*, official journal of IUPAC.

P. KROGH

## II DISCUSSION CONFERENCE ON MACROMOLECULES

Prague, 21-24 August 1972

Sponsored by IUPAC and IUPAB, the II Discussion Conference had as its theme *Macromolecular Matrices and Carriers of Biological Functions*. The programme included 11 main lectures and 6 discussion sessions on the following topics: (a) Synthesis of (bio)macromolecules on matrices; (b) Matrices and (bio)catalysis; (c) Matrices and energy conversion; (d) Matrices and specific interactions of (bio)macromolecules; (e) Macromolecular carriers of (bio)active agents. The number of active participants was 116 (46 from abroad) and 10 accompanying persons from 16 countries.

The Conference was intended to be opened (similarly to the I DC in 1970) by a lecture delivered by Prof. A. KATCHALSKY: two years ago he was prevented by family reasons and this year we had the appalling news of his tragic death. The participants paid homage to this great scientist by observing a minute of silence; Prof. CH. SADRON (France) spoke about the scientific work and the human qualities of the deceased.

The first lecture of the Conference presented by Prof. CH. SADRON (co-authors A. BRACK and M. LENG, France) was a certain 'Genesis' of the problem. He summarized the up-to-date state of the experimental work and theoretical considerations concerning the abiogenetic origin of the primary

biopolymers and primitive structures. Three basic steps of abiogenic polymerization were evaluated, namely, a random polymerization of a mixture of monomers, polymerization of monomers ordered on an inorganic matrix (especially clay materials), and polymerization on a matrix formed by a biopolymer. The biopolymeric matrix was the likeliest candidate for a system representing the real boundary between living and nonliving matter, because one could consider a real biological evolution only starting from autoreproduction. Prof. SADRON's lecture gave a thoroughly documented and chemically well founded basis for a serious investigation of just this key point.

Prof. E. M. BRADBURY (UK) dealt with the question to what extent modern methods of macromolecular physics and physical chemistry could contribute to the solution of the complicated structures of genetic elements of higher organisms, the chromosomes. Special attention was devoted to the basic proteins of the cell nucleus, to histones, and particularly to the way in which the polarity of the chemical composition was reflected in the specific manner of interaction of these proteins with the DNA molecules as carriers of the genetic information. The lecture showed that the present level of physical methods already allowed an investigation of complicated macromolecular interactions taking place in the living matter and provided an illustrative example of a methodical approach which could greatly contribute to the solution of complex biological problems.

The lecture by Prof. I. TASAKI (USA) was concentrated on the role played by the macromolecular components of the membrane of the nerve cells during its excitation. An investigation of the excitability of the nerve cell carried out on a model system of a squid giant axon helped to explain the key importance of the external concentration of calcium ions for the excitability of the nerve membrane. The results of measurements of the fluorescence of hydrophobic dyes sorbed in the membrane corroborated the view that the basic phenomenon involved in the excitation of the nerve fibre was a reversible transition of the macromolecular components of the nerve membrane from the hydrophobic to the hydrophilic state.

The lecture by Prof. M. V. VOLKENSTEIN (USSR) on the problem of electron-conformational interactions in molecular biophysics had to be cancelled, since the lecturer did not arrive at the Conference.

Prof. G. WEBER (USA) discussed the general mechanism of interactions of proteins with low- and high-molecular weight compounds. Using a simple thermodynamic analysis, he showed that the mutual influence of the ligands led to cooperative interaction, *i.e.*, mutual stabilization or destabilization of the ligands, independently of the character of the interaction—chemical or other. He applied similar considerations also to nonequilibrium chemically reacting protein systems (enzymatic reactions) and used his theory to explain how the free energy of the effector's bond could reverse the reaction course. The lecture presented a well founded analysis of the complex problem of the influence exerted by the mutual interaction of the components of the reacting system on metabolic reactions.

Prof. R. LUMRY (USA) discussed the problem of the general validity and a possible interpretation of the linear enthalpy-entropy compensation phenomenon. This term was used to designate the fact that around 16°C a number of systems reacted in aqueous solutions so that there was no change in free energy. The contributions of enthalpy and entropy term compensated each other. Prof. LUMRY offered an extensive survey of experimental proofs of this—as it seemed—general principle, not only by using systems of small molecules, but also processes as complex as enzymatic reactions or denatura-



tion of proteins. Although he outlined the possibilities of an interpretation of the general character of this principle, no final conclusions could be made so far.

Prof. B. ROSENBERG (USA), referring to the compensation law (discussed by Prof. LUMRY), showed its validity for the thermal denaturation of proteins. Besides the problems reported on in his lecture, Prof. ROSENBERG was also working in the field of inorganic cytostatics; he therefore passed from the molecular level to the question of the death of organisms including statistical data on human population. He discussed the formal mathematical expression of mortality and the partial roles played by the main death causes, *i.e.*, circulation diseases and cancer. He used the poikilothermic organisms to indicate the importance of body temperature on the kinetics of mortality. An extrapolation of these relations to the life-expectancy of human population aroused an understandable interest and an animated discussion. It could be demonstrated by a mathematical treatment that an artificial decrease in body temperature by two degrees should extend the mean life expectancy in the same way as a complete removal of the circulation diseases and cancer.

A still increasing interest in the field of both theoretical and applied research was enjoyed by heterogeneous systems obtained by the binding of active biopolymers (enzymes, antigens, antibodies, inhibitors, *etc.*) to synthetic polymer carriers. Prof. K. MOSBACH (Sweden) summarized the up-to-date state of knowledge in this area. He pointed out the effects exerted by various types of carrier and bond on the activity of an enzyme and gave examples of practical application. He also reported on the possibilities implied in affinity chromatography where the use of specific ligands allowed isolation of the active component from the complex mixtures practically in a single operation. In particular, the use of AMP proved to be a very effective means for the isolation of enzymes.

The vast perspectives offered by a combination of synthetic and natural polymers were outlined by Prof. O. WICHTERLE (Czechoslovakia). First, he defined the criteria which must be fulfilled by a synthetic carrier and then demonstrated with the example of hydrophilic gels that the carrier could be tailored for individual purposes. It was not only chemical composition that was involved here, but also the microstructure and surface modifications which increased the active surface by many times, allowing an easier contact of the enzyme with the substrate, *etc.* The lecture aroused a great response, since it showed that the region in which many practical results had been achieved to date was still in a stage which by no means could be called top productive. It would be fully developed only when the carriers were really tailored for the given purpose.

Prof. E. SELEGNY (France) chose as the topic of his lecture the physico-chemical approach to the complex problems of a facilitated and active transport of compounds through a living cell membrane. He demonstrated how it was possible, by solving relevant problems of diffusion-controlled chemical reactions, to contribute to a deeper understanding of the nature of complex processes controlling the transport of nutrients and metabolites in organisms, and also to construct synthetic or semisynthetic models and analogues of the biological functions of cell membranes.

The Conference was an occasion for scientists working in the fields of biological and macromolecular sciences to meet each other and to exchange their views on the most varied problems of the nature of biological functions, possibilities of their synthetic preparation, and particularly the application of knowledge thus obtained to the realization of systems with new functions.

Apart from having an informative value, the Conference had also a stimulative effect, since it would undoubtedly be an important impulse in seeking new functions which could be shown by the matter on the macromolecular level of its organization.

B. SEDLÁČEK

## V INTERNATIONAL CONGRESS ON CATALYSIS

Palm Beach, Florida, 21-25 August 1972

Over 500 delegates from 30 countries participated in the 5 day meeting.

The programme of the Congress covered the areas of fundamental contributions to the understanding of heterogeneous catalysis and homogeneous catalysis where it proposed correlations between heterogeneous and homogeneous catalysis. There were 106 papers presented and discussed at the meeting. Each day the programme started with a plenary lecture; the five lectures and their topics were:

R. J. KOKES (USA)	Hydrogenation and Related Reactions over Metal Oxides
R. UGO (Italy)	Coordination and Chemisorption: a New Kind of Photochemical Excitation?
K. HIROTA (Japan)	Refined Isotope (or Deuterium) Tracer Method in Mechanistic Studies of Heterogeneous Catalysis
P. CH. GRAVELLE (France)	Use of Heat-Flow Microcalorimetry in Heterogeneous Catalysis Research
J. BLOCK (Germany)	Surface Reactions and Field Induced Surface Reactions Investigated by Field Ion Mass Spectroscopy

The Proceedings of the Congress were to be issued in late March or early April 1973 by North-Holland Publishing Co. These Proceedings could be obtained by direct order to the publishers. Not only would the papers be included in the Proceedings but also the discussion which took place at the time of the meeting. A complete list of the Congress participants and their addresses would be included in this publication.

V. HAENSEL

## X MICROSYMPOSIUM ON MACROMOLECULES: CONFORMATIONAL STRUCTURE OF POLYMERS

Prague, 28-31 August 1972

The programme consisted of 7 main lectures (to be published in *Pure and Applied Chemistry*), 33 short communications (which were presented and discussed in 5 sessions), and 4 special discussion sessions on the main themes of the Microsymposium and of the individual main lectures. The scientific programme of the Microsymposium was concentrated on the discussion of the following problems: (1) Theoretical prediction and interpretation of the conformational transitions in polymers; (2) Experimental methods of investigation of the conformational structures of polymers and their dynamics;

(3) Stable conformations and conformational transitions in biopolymeric and bioanalogous molecules; (4) Conformational structure and internal mobility of synthetic polymers. The number of active participants was 129 (84 from abroad) and 12 accompanying persons from 18 countries.

In his opening lecture, Prof. H. A. SCHERAGA (USA) showed that the dominant role of interactions between the sidechain of the aminoacid residue and the backbone in determining the conformational structure of polypeptides and proteins had been demonstrated. The author designated these interactions as 'short range' interactions. He showed that the aminoacid residues could be divided into three groups: helix-breakers, helix-indifferent and helix-formers. The presence of these types of sidechain determined the appearance of  $\alpha$ -helix conformations and the number of  $\beta$ -turns. These ideas were being applied in conformational energy calculations to determine the native conformations of proteins. It was evident that this approach, combined with the usual energy-minimalization procedures, obviated the necessity of solving the multiple-minimum problem and might lead more directly to a true picture of the conformational structure of polypeptides and proteins.

Prof. M. V. VOLKENSTEIN (USSR) clearly demonstrated how important it was to respect electronic-conformational interactions in the development of the physical theory of biopolymers. By analogy with the phonon, he introduced the concept of the 'conformon'; though lacking physical reality, this concept appeared useful in theoretical discussions. The coupling of electronic and conformational changes had been demonstrated in several examples of enzymatic catalysis, and the results obtained had been interpreted in terms of the previously presented theory. Similar information concerning electronic-conformational interactions might be obtained from studies of proteolysis.

An extensive contribution by V. P. BYSTROV (USSR) was additionally included in the programme of the main lectures (coauthors: S. L. PORTNOVA, T. A. BALASHOVA, S. A. KOZMIN, YU. D. GAVRILOV, and V. A. AFANASYEV). The lecture was a survey of modern NMR methods developed in the first place in the author's laboratory and used for characterization of conformational structures of oligopeptides and polypeptides. The lecture contained many valuable data and aroused great interest among the participants.

Prof. E. M. BRADBURY (UK) reviewed the current state of theories interpreting the shape of high resolution NMR spectra of polypeptides in the  $\alpha$ -helix—random coil transition region. The two  $\alpha$ -CH proton peaks which were observed in solutions known (by other methods) to contain coexisting  $\alpha$ -helix and random coil segments had been interpreted in several ways. In the present lecture, good arguments were put forward in favour of theories explaining the existence of two separate  $\alpha$ -CH peaks on the basis of the polydispersity of the polypeptide samples. However, the problem of equal line-width of the random coil and  $\alpha$ -helix peaks still appeared to lack a completely satisfactory interpretation. New data from Fourier transform spectra was presented, largely reflecting previous experience from proton NMR.  $^{13}\text{C}$   $T_1$  values accessible from Fourier transform spectra might open up new views concerning the motional mechanism of the polypeptide chain.

In his lecture Prof. G. ZERBI (Italy) showed that it was possible to study structure irregularities in chain-forming molecules or macromolecular chains, if the force field in the irregular structures was assumed to be equal to that of the regular ones. In this case, the L vectors could be calculated from the density of states. The bands assigned to irregular structures could be determined by the introduction of the corresponding kinematic constants. The feasibility of this approach was verified by comparison of experimental



spectra with computer generated spectra calculated for various types and contents of irregularities. The influence of irregularities in mass was studied on -HCl-DCI- chains, the influence of irregularities in the geometry on polyethylene and Teflon. It was shown that by this method, the amorphous bands in polyethylene and the frequencies assigned to chain folds in polyethylene mono-crystals, could be explained. Also in Teflon, bands of irregular structures could be interpreted. The lecture indicated that with this approach, vibrational spectra could be applied to polymer structure investigations, even without a knowledge of dipole moments or polarizabilities in the molecule.

Vibrational motions in molecules could involve either the movement of only a group of atoms, or a deformation of a whole molecule. The first type of vibrational motions was called by Prof. T. SHIMANOUCHI (Japan) 'local vibrations', and the other type 'overall vibrations'. Both types of motion were demonstrated by the example of 1,2-dichloroethane. Motions of whole molecules, originating from an interaction of 'overall vibrations' in long chain paraffins, cyclic paraffins and peptide chains, had been calculated by means of a known force field. The results demonstrated on models by means of a film showed motions with surprisingly large amplitudes originating only from 'overall vibrations'. The results of these calculations indicated that due to the large amplitudes, the 'overall vibrations' should be considered in studies of various physical properties of polymeric systems where vibrational motions had been neglected so far.

In the first part of his lecture, Prof. W. G. FATELEY (USA) discussed the problems of OH-group rotational barriers in *p*-substituted phenols. He showed that barrier heights determined experimentally from torsional vibrations were in good agreement with theoretically calculated values. The barrier height depended on a parameter describing the 'electronic climate' about the C-O bond. The author indicated that further measurements on a large number of monosubstituted phenols provided sufficient data to allow the prediction of barriers and torsional frequencies in multisubstituted phenols. The second part of his lecture was devoted to a more general discussion of problems connected with studies of internal rotation about C-C, C-O, C-N, and C-S single bonds by means of far IR spectra. For the case of an asymmetrical potential function, the influence of various groups, geometrical changes during rotation, and of higher order terms was discussed. Procedures for obtaining barrier heights from asymmetric potential curves were shown. The transferability of barrier data and the possibility of their application to macromolecules was also discussed.

It was the aim of the X Microsymposium to give a comprehensive survey of theory (prediction and interpretation of conformational structure and its changes) and experimental means used for investigation of the conformational structure of polymers. The level of the lectures, communications, and discussions and their response on the part of the participants indicated that the aim was fulfilled satisfactorily.

B. SEDLÁČEK

## **I INTERNATIONAL SYMPOSIUM ON ADVANCES IN MICROBIAL ENGINEERING**

**Mariánské Lázně, 28 August-1 September 1972**

The Symposium was attended altogether by 310 participants, of which 280 took an active part in the deliberations and 30 persons accompanied the

active participants. Some 20 participants came from overseas, 55 were registered from Czechoslovakia. The symposium was divided into five main thematic groups and it was subdivided into nine full-day actual subsections, or sessions: A1—Growth kinetics; Mathematical model development, A2—Growth kinetics; Kinetics and application of data, B1—Product formation; Kinetics, optimization, and economic aspects, B2—Product formation; Kinetics application to specific productions, C1—Fermenter design fundamentals; Hydraulic fundamentals, C2—Fermenter design fundamentals; Mass and heat transfer fundamentals, D1—Fermenter operation and control; Process analysis and control, D2—Fermenter operation and control; Fermentation and control equipment, E1—Other operations in microbial engineering. The main lectures were to be published in the official IUPAC journal, *Pure and Applied Chemistry*, during 1973.

The Symposium began with a general introduction presented by B. SIKYTA (Czechoslovakia) and immediately afterwards the first session was opened dealing with the first topics on Growth kinetics. The introductory lecture was presented by A. C. R. DEAN (UK) and it dealt with control mechanism in bacterial cells. The models presented were based mostly on the simple Monod equation, as well as in other contributions to this session. DEAN's contribution was devoted to control in integrated cell units both in steady state and in nonsteady state conditions. R. MATSCHÉ (Austria) adapted the Monod equation for description of propagation of thermophilic organisms and for their lysis. A rather more deeply involved analysis was presented by L. N. ANDREEVA (USSR) in her study of the influence of pH on growth rate, by J. KIEFER (GFR), and by L. A. MUZYCHENKO (USSR). The latter based the thermodynamic properties in cell interaction with the liquid substrate as a suitable model for heterogeneous conversion of hydrocarbons to biomass. A. G. LANE's (France) approach presented an entirely different view of growth kinetics because it was based on fundamental processes involved in energy formation (glycolysis and oxidative phosphorylation).

The second session was a continuation of the treatment of Growth kinetics problems, being concerned with application of kinetic data to specific cases of microbial growth. Because a great number of microbiologists attended the Symposium, the session was supplied with a large number of papers. V. V. BIRYUKOV (USSR) applied diffusion laws to the description of substrate permeability into microbial colonies; V. A. SAMOYLENKO (USSR) used the phase diagram to describe transition phenomena in a continuous culture. L. E. ERICKSON (USA) presented a quantitative description of the deparaffination of mineral oils, L. A. MUZYCHENKO (USSR) suggested optimal pH and temperature conditions based on the calculus of variations. V. K. EROSHIN (USSR) derived some known facts on biomass yield, oxygen consumption, and heat evolution based on the laws of conservation of mass and energy. More qualitatively minded were the contributions of I. L. RABOTNOVA (USSR), A. HLÁŠZE (Hungary), G. HAMER (UK), J. JAKUBOWSKA (Poland), V. V. MITIYAEVA (USSR), among others.

Section B, held in two sessions, was devoted to problems of product formation. Less sophistication was obvious at present in this case and the models presented in the first session, Kinetics, optimization, and economic aspects, were therefore on a simpler basis than in the preceding session. A. KŘEMEN (Czechoslovakia) presented an original model of tetracycline formation based on thermodynamics, V. M. FISHMAN (USSR) applied known kinetic principles to the production of secondary metabolites, activity coefficients being used; A. CONSTANTINIDES (USA) used Pontryagin's principle



for optimization of penicillin production with respect to pH and temperature. F. MACHEK's (Czechoslovakia) approach was more experimental, as well as the contributions of J. PELECHOVÁ (Czechoslovakia) and G. KLEINER (USSR). Economic aspects in semicontinuous fermentation of beer were summarized by A. P. MAULE (UK).

Session B2, as with session A2, gave forum to more specific cases of applied kinetics. The introductory lecture was delivered by V. L. YAROVENKO and B. M. NAKHMANOVICH (USSR) and it treated the kinetics of ethanol production. On identical grounds were the contributions of G. STRAUBE (GDR) and M. E. BEKER (USSR), who also used first order kinetics to relate growth kinetics and product synthesis. The remaining work was mostly qualitative and concerned the production of antibiotics, steroids, and some special products.

The first session of Section C was introduced by B. ATKINSON (UK), who gave a survey of design procedures for various apparatus involving microbial films. Hydraulics of tubular fermenters was treated by L. E. ERICKSON (USA) and A. MOSER (Austria). The use of radioactive tracer for the determination of mixing homogeneity was reported by E. S. BYLINKINA (USSR). Gas holdup in air lift fermenters was followed by M. CHAKRAVARTY (India). J. KLOUD (Czechoslovakia) and A. PROKOP (Czechoslovakia) were concerned with disperse systems and their characteristics; KLOUD treated the gas-liquid (suspension) system, whereas PROKOP was interested in droplet size distributions in hydrocarbon fermentations.

In session C2 mass transfer problems were summarized in the introductory lecture by N. BLAKEBROUGH (UK). Most of the work presented was concerned with oxygen transfer in aerobic fermentations. V. V. BIRYUKOV (USSR) used the 'heavy' (viscosity corrected) sulfite number for modelling of nonNewtonian fluids. W. J. MCMANAMEY (Australia) followed oxygen transfer in paper pulp, R. N. GREENSHIELDS (UK) treated oxygen transfer in a tower fermenter, scale up to larger size was demonstrated by D. D. Y. RYU (USA). Substrate transfer was followed by H. W. D. KATINGER (Austria) for hydrocarbons, by A. EINSELE (Switzerland) for oxygen and hydrocarbons. Gaseous substrates were treated by G. HAMER (UK). A. MIMURA (Japan) measured oxygen transfer in hydrocarbon media. The only work devoted to heat transfer was that of R. ERIKSSON (Sweden) who used the LKB microcalorimeter for determination of optimal heat transfer conditions.

Session D1 was introduced by a lecture on control of aeration and agitation in antibiotics fermentations by L. D. SHTOFFER (USSR), and session D2 by a lecture dealing with the role of nonideal flow in tubular fermenter design and operation by Z. ŠTĚRBÁČEK (Czechoslovakia). The first session dealt with various optimization methods and ways. H. WEIDE (GDR) and L. A. MUZYCHENKO (USSR) solved the problem of fermentation control by substrate feed control, R. D. SOIFER (USSR) referred to foam problems in control of antibiotics production, P. A. VAN HEMERT (Netherlands) and E. OURA (Finland) treated the problem of optimal oxygen supply. M. I. ROZHKOVA (USSR) devoted her work to optimization of growth rate on hydrocarbons. Mostly single parameter models were treated throughout these contributions. Multi parameter models generally required the use of computers. Their use for fermentation control was summarized by D. S. FLYNN (UK). Based on simple kinetics and on material balance control, a computer control of fermentation processes was suggested in two papers by R. P. JEFFERIS III (USA).

Session D2 was mainly concerned with obtaining optimal conditions



within the equipment proper and with optimal selection of control instruments or its application. Fermentation equipment was treated in the contributions of M. E. BEKER (USSR), GREENSHIELDS (UK), CH. G. T. EVANS (UK), and J. CAMERON (Canada). The latter two authors treated the special requirements for equipment dealing with pathogenic microorganisms. Measuring elements for redox potential were elaborated by I. L. RABOTNOVA (USSR) and H. E. JACOB (GDR); A. PROKOP (Czechoslovakia) referred to dynamic properties of the glass oxygen electrode. G. GUALANDI (Italy) treated some sampling devices used in continuous cultivation. The way of obtaining and treatment of data for computers was presented by H. BLACHERE (France).

Section E1 summarized all other items important for production of microorganisms and for treatment of the fermentation products. It was introduced in a lecture by L. EDEBO (Sweden) devoted to cell disintegration and protein recovery. Kinetics of air sterilization using ethylene oxide was described by R. R. ERNST (USA), combined thermal and chemical sterilization was treated by D. HAL'AMA (Czechoslovakia), air sterilization was reviewed by G. L. MOTINA (USSR) and PETTERSON (Sweden). Filtration of fermentation broths was treated by S. A. ZHUKOVSKAYA (USSR), centrifugation by Å. LARSSON (Sweden) and V. PITAŠ (Czechoslovakia), evaporation was dealt with by V. KRUMPHANZL (Czechoslovakia), biological flotation by J. BÁRTA (Czechoslovakia). A complete way of isolating protein from microorganisms was given by Z. FENCL (Czechoslovakia), CHALOUPKA (Czechoslovakia) described the influence of physiological state on cell disintegration.

Z. ŠTĚRBÁČEK

## **XI MICROSYMPOSIUM ON MACROMOLECULES: MECHANISM OF INHIBITION PROCESSES IN POLYMERS—OXIDATIVE AND PHOTOCHEMICAL DEGRADATION**

**Prague, 4-7 September 1972**

The scientific programme was devoted to the following topics: (1) Degradation and stabilization processes during the photooxidation of polymers; (2) Studies of the activity and mechanism of action of stabilizers during the thermo- and photooxidative degradation of polymers; (3) Transformations of stabilizers during the degradation of polymers (structural, mechanistic, and analytical aspects); (4) Degradation and stabilization of polymers against thermooxidation. Seven main lectures (to be published in *Pure and Applied Chemistry*) and 29 short communications were presented (in 6 sessions); 4 special discussion sessions were concentrated on the problems contained in the main lectures and on more general aspects determined by the main topics of the Microsymposium. Some 144 active participants took part in the meeting (89 from abroad), together with 19 accompanying persons from 17 countries.

Energetics aspects occurring in the degradation of polymers induced by radiation processes were outlined by Prof. J. E. GUILLET (Canada) in his lecture *Role of Energy Transfer in Polymer Degradation and Stabilization*. The role of impurities and of secondary oxidation products of polymers in the whole process was considered. The most usual mechanism involved in

the degradation process caused by UV light was photosensitized oxidation. Attention was paid mainly to the role of carbonyl groups. Experimental results obtained in the elucidation of polymeric systems having a controlled amount of carbonyl groups in the backbone as well as in the side chains, were discussed. All conclusions were given on the basis of energy transfer occurring in photochemical processes in the solid state; some aspects of behaviour in poor and good solvents were involved. The rigidity of systems under study, rotation of groups on polymeric chain, and overall conditions played an important role. The possibility to stabilize the polymer using molecular motion of hanging groups was presented and models for processes and mechanisms for stabilization of polymers were given. With further examples, the difference in quenching activities of low molecular carbonyl compounds as well as polymers containing carbonyls in various distances and sequences in the chain, and the possible role of solvent systems were demonstrated. It was shown how the energy transfer process entered and was applicable in the quenching of photoexcited states degradation process.

Autoxidation of polymers induced by photolytically generated radicals was a major contributor to the observed overall degradation process. In his lecture *Some Aspects of Stabilization of Polymers against Light*, Dr. H. J. HELLER (Switzerland; coauthor: Dr. H. J. BLATTMANN) discussed in detail various possibilities for light stabilization: UV absorption, quenching of excited states, scavenging of photolytically produced radicals, and protection against radicals formation by deactivation of hydroperoxides. Schematic presentation of reactions involved in the light induced degradation of polymers with aliphatic backbone and types of additive providing protection against the individual reactions were given. Effectiveness of individual processes of stabilization and some relations between them, and aspects of mechanisms of action of basic types of stabilizer were presented. The up-to-date state of knowledge of the protection of polymers against photodegradation was discussed at high level and new developments of perspective types of stabilizer for various kinds of polymer was included. Attention was paid to relations between physicochemical properties of stabilizers and their effectiveness.

Phosphite esters formed a very interesting group of antioxidants for various polymers. Prof. G. SCOTT (UK; coauthor: Dr. K. J. HUMPHRIS) presented new and important results on the mechanism of their antioxidant action. The data were based on the elucidation of a series of catechol phosphite esters. These compounds were very powerful antioxidants and appeared to behave differently from simple alkyl and aryl phosphites in the way that they destroyed hydroperoxides in a Lewis acid catalysed reaction. Some products of their transformations were isolated and their properties established. It was shown on the basis of extensive experimental material that effective catalyst was formed from the starting ester by reaction with hydroperoxides in a series of steps which involved the formation of free radicals during the initial stages. Some of the isolated products of transformation were themselves powerful thermal and UV stabilizers. The group of studied aryl catechol phosphites was extraordinarily important from a scientific as well as technical point of view.

The formation and significance of polyconjugated systems in thermal and thermooxidative processes was the topic of the lecture by Prof. A. A. BERLIN (USSR). Aspects of paramagnetic behaviour of PCS and their influence on physicochemical properties of substances forming complexes with them were given. Theoretical features of the formation and the role of PCS in thermolysis



and thermooxidation of polymers were discussed and data on the inhibitive activity of resinlike oxidation products of some organic compounds were described. The chemical mechanism of formation of these resins during thermooxidative processes was not known exactly. A very important role was played by PCS in inhibited thermooxidation. Using suitable compounds, transformation products were formed having higher radical reactivity than the initial monomeric inhibitor. This increased efficiency was caused by a greater conjugation in the whole system. PCS caused the decay of hydroperoxides and took part to a lesser degree in the initiation step of degradation of polymers at high temperatures. Synergism in the inhibitive activity in a mixture of initial and oxidized stabilizers was observed. A 'self-stabilization' process including joint transformations of polymers and antioxidants in inhibited thermooxidation was connected with the formation of PCS. Understanding of these processes opened a new possibility for the preparation of highly effective stabilizers for polymers.

A survey of types and properties of products formed by oxidation of mono- and binuclear phenols was given in the lecture of Dr. J. POSPIŠIL (Czechoslovakia), dealing with the transformations of phenolic antioxidants during the inhibited oxidation of polyolefins. Compounds were included prepared by independent syntheses and destined to gather complex data on physical and chemical properties, as well as products of model transformations formed under conditions simulating interactions of antioxidants with radicals  $RO\cdot$  and/or  $ROO\cdot$ , alkylhydroperoxides or oxygen during inhibited oxidation of hydrocarbons. Special attention was paid to transformation products identified in oxidized hydrocarbon systems stabilized with phenols when the results were specifically influenced by the conditions of the process, especially by temperature. A specific behaviour of some products of transformation was shown at temperatures close to the atmospheric aging and at those of the processing of polyolefins. Using results of model studies in simple stabilization systems based on the knowledge of the character of transformation products, the necessity was shown to pay deeper attention to the formation and properties of transformation products, because they could further influence the process of aging of polymers.

Prof. E. SCHRÖDER (GDR) spoke on progress in the field of analytical methods for stabilizers and products of their transformation in polymers. He concentrated especially on decomposition and conversion products, including reaction products with polymers. Aspects of separation problems occurring during the isolation of stabilizers and of products of their transformation from the polymer as well as problems of the separation of mixtures of low molecular substances thus obtained were discussed in detail. Extraction agents for main types of stabilizer and various polymers were reviewed. The discussion was concentrated on the characteristic types of stabilizer, individual methods of separation of various systems of stabilizer, and problems of structure examination of transformation products. It was shown with examples that a successful analysis was possible by combining selective separation processes with all possible analytical detection and determination processes of high sensitivity and selectivity adapted for the system under study.

Dr. H. NAARMANN (GFR) discussed in his lecture *Problems incurred in Stabilization of Polymers against Oxidative Degradation*, results of model studies dealing with the role of active functional groups in polyethylene and presented data on some new inhibitors. In the first part, the author tried to establish a relationship between oxidative degradation and the chemical



structure of oxidation products with defined functional groups (peroxide, carbonyl, hydroxyl, vinyl). Model compounds were synthesized in which the nature and amount of functional groups differed. The behaviour of these compounds was compared under the conditions of the oxidation test. An important relationship between the induction time and the type of functional group was found which allowed a sequence of reactivity to be drawn. The most pronounced effect was caused by peroxide groups. In the second part, the synthesis and stabilizing activity of a series of sulfidic compounds was presented. The functional groups of these compounds compensated for the injurious effect of functional groups formed in polyethylene. As a result, these compounds acted as inhibitors. During the process, the sulfidic group was converted to sulphoxide and sulphone; model stabilizers containing vinylic double bonds participated in disproportionation and addition reactions. The results presented gave new ideas for the process of stabilization of polyolefins.

The XI Microsymposium provided a highly qualified scientific forum for an exchange of knowledge and experience between researchers working in academic and industrial laboratories. The activities of the Microsymposium (main lectures, discussions, and short communications) aroused great interest, so that the meeting could be regarded as having had an intensively creative character and a favourable ambiance.

B. SEDLÁČEK

### **III INTERNATIONAL SYMPOSIUM ON CAROTENOIDS OTHER THAN VITAMIN A**

**Cluj, 4-7 September 1972**

This Symposium, sponsored by the Romanian Ministry of Education, Romanian Academy, and IUPAC, took place at the Institute of Agronomy in Cluj. It followed the II Symposium held three years ago at Las Cruces, New Mexico.

Nearly 100 chemists, biochemists, and physiologists from 15 countries participated and 51 contributed papers were presented. Contributions came from Australia (1), Bulgaria (1), France (6), West and East Germany (6), Hungary (1), Italy (1), Japan (1), Norway (7), Poland (1), Romania (7), Switzerland (2), UK (4), USA (10), USSR (3).

Official welcomes were presented in the Opening Session by Prof. E. NEGRUJIU, Rector of the Institute of Agronomy; A. DUCA, President of the Administrative Council, Cluj; Prof. C. BODEA, Symposium Chairman; and Prof. B. C. L. WEEDON, official representative of IUPAC.

Prof. BODEA paid tribute to the memory of two distinguished scientists who had devoted a great deal of their scientific work to the study of carotenoids: Prof. L. ZECHMEISTER, who died in March 1972 in Pasadena, California, at the age of 82 and Prof. E. C. GROB, of Bern, who registered as an active member of the Symposium but died suddenly in June this year at the age of 58.

The scientific programme was devoted to physical and chemical properties, structures, synthesis, biosynthesis of carotenoids, as well as their functions in microorganisms, plants, and animals.

Six plenary lectures were given:

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|--------------------|--|
| B. H. DAVIES (UK)  | Carotene Biosynthesis in Fungi                               |
| T. W. GOODWIN (UK) | New Experiments on Carotenoid Biosynthesis in Microorganisms |

S. LIAAEN JENSEN (Norway)	Structural Elucidation of Carotenoids—A Progress Report
D. I. SAPOZHNIKOV (USSR)	Investigation of the Violaxanthin Cycle
B. C. L. WEEDON (UK)	Some Recent Studies on Carotenoids and Related Compounds
O. B. WEEKS (USA)	Photoregulated Carotenogenesis in Nonphotosynthetic Bacteria

The plenary lectures were to be published in the official IUPAC journal, *Pure and Applied Chemistry* [Vol. 34, No. 4, 1973]. Abstracts of the communications presented at the Symposium were reproduced in a special booklet, available from the library of the Institute of Agronomy.

At the closing banquet the proposal was made that the IV Symposium on Carotenoids be held in 1975 in Switzerland.

C. BODEA

## I IUPAC CONFERENCE ON PHYSICAL ORGANIC CHEMISTRY

Crans-sur-Sierre, 4-8 September 1972

The Organic Chemistry Division of IUPAC decided at the XXV IUPAC Conference (1969) that there should be a biennial symposium in each of three areas which the Division considered to be of principal importance for organic chemists, namely the chemistry of natural products, organic synthesis, and physical organic chemistry.

The Symposia on the Chemistry of Natural Products were already well established for 16 years. The latest meeting in this series was held in New Delhi in February 1972 and the next was being organized in Canada in 1974. It was hoped that the first Symposium on Organic Synthesis would be held in Belgium in 1974.

The series of meetings in the third field was inaugurated in September 1972 with the I IUPAC Conference on Physical Organic Chemistry in Crans-sur-Sierre, a well known resort in the French-speaking part of the Swiss Alps.

It was organized by an International Committee consisting of 12 members from academic and industrial institutions in 9 countries. Prof. P. D. BARTLETT (USA) was Honorary Chairman, Prof. E. HEILBRONNER (Switzerland) was in charge of finance, Prof. H. ZOLLINGER (Switzerland) was responsible for the organization.

This Conference being the first of a series, it was necessary for the International Committee to make certain decisions which, it was hoped, would be applicable to the following Conferences of the series. In particular, it was the opinion of the Committee that both aspects of physical organic chemistry, namely the application of the methods of classical physical chemistry to the elucidation of reaction mechanisms and structure (kinetics, equilibria, applied spectroscopy, etc.) and the use of quantum chemistry as a tool for solving problems in organic chemistry should be the topic of these Conferences. It was emphasized by Prof. BARTLETT in his remarks at the closing session of the first Conference that physical organic chemistry should remain an integral part of organic chemistry, utilizing the techniques of physical chemistry but applying them in such a manner to provide chemists with a better and quicker understanding of the problems of organic chemistry.

The International Committee chose three major topics for this particular Conference: (A) New methods for elucidation of the structure of unstable intermediates, including biradicals, (B) Solvent/solute interactions, and (C) Reaction mechanisms of organometallic compounds.

In addition, a special topic was chosen for one of the evening sessions, and for this the International Committee decided to invite Prof. J. N. PITTS (USA) to lecture on *Correlations of Physical Organic Chemistry with Environmental Problems*, in the hope that such a subject would stimulate physical organic chemists to think about potential contributions of their science to the solution of environmental problems of the present and the future. Prof. PITTS was, indeed, able to demonstrate that the methods of physical organic chemistry when applied to a study of the mechanism of gas reactions taking place in the atmosphere above large cities such as Los Angeles, were helpful in understanding and solving the problems related to air pollution.

For each of the three major topics, three plenary lecturers were invited. In topic A, Prof. J. I. BRAUMAN (USA) spoke on *Applications of Ion Cyclotron Resonance Spectroscopy—Stabilities of Negative Ions in the Gas Phase*, Prof. H. FISCHER (Switzerland) on *Chemically induced Dynamic Nuclear Polarization and the Detection of Transient Free Radicals*, and Prof. J. A. POPLE (USA) on *Structures of Some Unstable Molecules by Molecular Orbital Theory*.

The first two lectures demonstrated that these new experimental methods could be of great use in the detection of short lived compounds and for the understanding of correlations between physicochemical properties with structural effects. Prof. POPLE's paper contained some good examples of calculated stabilities of various structures for an ion or molecule which, at present, could not be investigated experimentally. The limits of the methods currently used for such investigations were noted and were further defined in the two plenary lectures in topic B (the third invited lecturer, Prof. A. E. LUTSKI, was unfortunately unable to attend the Conference).

In this section Prof. E. M. ARNETT (USA) discussed the various contributions to the stability of components of acid-base equilibria in solution—work which enabled the participants to draw interesting conclusions from the results discussed by Prof. BRAUMAN who measured thermodynamic parameters of such components in the gas phase, *i.e.*, without contributions from solvent interactions. Prof. C. D. RITCHIE (USA) described in detail the nucleophilicity order of bases in reactions with diazonium ions, carbonium ions\* of the Malachite Green type and Propylum ions in a number of solvents. In contrast to earlier work in this field, the reactions could be correlated by assigning a parameter  $N_+$  to each nucleophile in a particular solvent, where  $N_+$  was a measure of the partial desolvation energy of the nucleophile on going from the reactants to the transition state.

In topic C, Prof. E. C. ASHBY's (USA) lecture demonstrated that, as a result of careful experimentation, the structures and reactivities of organo-metallic compounds—in particular Grignard reagents—were much better understood today than a short time ago. The lectures of Profs. J. HALPERN (USA) and G. WILKE (Germany) were devoted to catalytic mechanisms involving transition metal complexes.

The large number of applications for presentation of contributed papers (48) forced the organizers, considering the recommendations of the respective referees, to divide these contributions into papers to be presented in full sessions and in discussion groups. The latter system was employed also at

\*Nomenclature suggested by G. A. OLAH for tricoordinated carbon cations, in contrast to the pentacoordinated carbonium ion.



the XXIII IUPAC Congress (Boston, 1971). At a smaller Conference like that in Crans-sur-Sierre, it seemed that discussion group papers were not to be recommended since in most cases the groups were too large (20-60 participants), thereby forcing the authors to present their work in the usual lecture-type style.

All participants agreed that the scientific level of the plenary lectures was exceptionally high and that the presentation was perfect. The contributed papers included reports of excellent and pioneering ('frontier') investigations; others were, however, not up to such a high standard. The international character of the Conference was well documented by the fact that participants came from 22 countries. Participation was originally limited to 200, but in fact 205 participants were present, a number which, under the circumstances, appeared to be just right.

The success of the Conference convinced the participants that there was, indeed, a need for regular meetings in this field. The II Conference on Physical Organic Chemistry would take place in 1974 in Netherlands; correspondence concerning the III Conference (1976) had started already! The International Committee of the first Conference decided also to make an application to IUPAC to create a Commission on Physical Organic Chemistry within the Organic Chemistry Division in order to correlate better the work done in this field with related work carried out by physical and analytical chemists.

H. ZOLLINGER

## **VI INTERNATIONAL CONGRESS ON SURFACE ACTIVE SUBSTANCES**

**Zürich, 11-15 September 1972**

For the first time, the International Congress on Surface Active Substances was sponsored by IUPAC. This series of meetings was started in 1954 when the 'Congrès mondial de la détergence et des produits tensio-actifs' took place in Paris. It was organized, as were the following Congresses, by Comité International des Dérivés Tensio-Actifs (CID). This is an organization of the respective National Committees of 17 countries: Argentina, Austria, Belgium, Czechoslovakia, France, Germany, Israel, Italy, Japan, Netherlands, Portugal, Spain, Sweden, Switzerland, UK, USSR, and Yugoslavia. The secretarial office is in Paris.

The Organizing Committee of the Congress in Zürich was presided over by Dr. G. DÜRIG (Basle) in his capacity as President of CID. The Committee was composed of the President of the local Executive Committee, Dr. A. OBRIST (Basle); Vice-President of CID, Dr. P. L. KOOLJMAN (Bloemendaal); President of the Scientific Commission, Prof. H. ZOLLINGER (Zürich); Presidents of Honour of CID; and all Presidents of the National Committees and the Secretary General of CID.

The Scientific Commission under the Chairmanship of Prof. ZOLLINGER (above) and with Dr. M. KELLER (Basle) as Secretary, consisted of the three Presidents of the International (technical) Commissions of CID and 29 scientists from 10 countries.

Three plenary lectures were given: Dr. E. ISELIN (Sandoz AG, Basle) on *Grenzflächenaktive Stoffe und Umweltschutz*; Prof. S. HARTLAND (University of Nottingham and ETH Zürich) on *Effect of Surface Active Agents on Coalescence of Liquid Drops*; and Prof. P. DESNUELLE (Université de Mar-

seille) on *Action de la Lipase et de la Phospholipase sur les Substrats en Emulsion, à l'État de Micelles et en Couches monomoléculaires*. In three sections and 17 groups, a total of 179 contributed papers was presented in 6 parallel sessions. Sections A, B, and C contained papers on the chemistry, the physical chemistry, and the application of surface active substances, respectively.

The Congress was attended by some 800 participants from 17 countries. Swiss chemical industry, particularly the Schweizerische Gesellschaft für Chemische Industrie (Zürich) and CIBA-GEIGY AG and Sandoz AG (Basle) placed a large number of personnel at the disposal of the Organizing Committee. Therefore, the general organization and the social and ladies programmes were excellent. The Scientific Commission was in charge of screening the contributed papers and discussed in general terms some proposals for future Congresses in this series.

This Congress showed clearly that it fulfils the need of communicating research results from various countries and provides opportunities for fruitful contacts between academic scientists and those scientists working in industry on fundamental problems, synthesis, and application of surface active substances.

H. ZOLLINGER

### **III INTERNATIONAL SYMPOSIUM ON MEDICINAL CHEMISTRY**

**Milan, 13-15 September 1972**

The Symposium, organized by the Società Italiana di Scienze Farmaceutiche under the sponsorship of IUPAC, was held at the University of Milan. It was attended by 291 participants from 23 countries. Nine main lectures and 10 special contributions, all given by invited speakers, were devoted to the following topics:

I—Biochemistry of Microorganisms as a Basis for Rational Development of Antiinfectious Agents

II—Synthetic Analogues of Biochemical Messengers

III—Physicochemical Properties and Biological Action

Opening the Symposium, the Chairman of the Organizing Committee, Prof. P. PRATESI, pointed out that the above-mentioned topics represented vivid examples of mutual cooperation among the basic sciences of medicinal chemistry. The Organizers felt that the main function of medicinal chemistry conferences was precisely to stimulate basic research in this field, to extend its frontiers and thus to encourage a better approach to therapeutic problems, in the interest of public health.

On the first topic, D. VAZQUEZ (Spain) referred to the mechanisms of selectivity and action of protein synthesis inhibitors, classifying the various inhibitors of protein synthesis according to their specificity on procaryotic systems, eucaryotic systems, and both systems.

H. R. PERKINS (UK) and J. M. GHUYSEN (Belgium) presented two papers related to the significance of D-alanyl-D-alanine termini in the biosynthesis of the peptidoglycans of bacterial cell walls and the action of penicillin, vancomycin, and ristocetin. A new model for the transpeptidation reaction involved in the biosynthesis of the bacterial wall peptidoglycan and for its

inhibition by penicillin had been proposed, based mainly on the demonstration that carboxypeptidase and transpeptidase activities were performed by the same enzyme.

P. SENSI (Italy) pointed out that the enzymes which transcribed DNA, synthesizing RNA, were targets for chemotherapeutic agents. Specific inhibitors of procaryotic DNA-dependent RNA polymerase were some *ansa* antibiotics such as rifamycins and streptovaricins. Their activity on other transcribing enzymes, in particular the RNA-dependent DNA polymerase of oncogenic RNA viruses, was also discussed.

K. HEUSLER (Switzerland) discussed in detail the structural requirements for antibacterial activity in the field of  $\beta$ -lactam antibiotics, based on the comparison of structural variations of natural, semisynthetic, and total synthetic analogues.

F. ARCAMONE (Italy) referred to distamycin A and related synthetic analogues as selective antiviral agents and on the structural requirements for action. The mechanism of action of distamycin A in comparison with other antiviral agents was also discussed.

In the session concerning the synthetic analogues of biochemical messengers, M. NELBOEK (Germany) referred to chemical and pharmacological researches on analogues of cAMP, stimulated by Sutherland's second messenger model. According to NELBOEK some of these analogues showed relatively high specificity of physiological responses, such as separation of metabolic and contractile effects.

E. COSTA (USA) discussed various problems related to the localization of catecholamines at the level of the axon terminals of sympathetic neurons. Using a new mass fragmentographic method for the catecholamines assay, examples were presented showing the various mechanisms whereby drugs changed the rates of norepinephrine turnover.

The amphibian skin represented an enormous storehouse of biogenic amines and peptides with biological activity. According to V. ERSPAMER (Italy) peptides of the amphibian skin were very similar or identical in their structure to active peptides occurring in mammalian tissues. Hence their conspicuous interest, transcending the field of comparative pharmacology. It was possible that active aminoacid sequences first discovered in amphibian skin might lead to the discovery of similar sequences, *i.e.*, of new biochemical messengers in mammalian tissues.

G. CEHOVIC (France) referred to the synthesis of new cAMP derivatives, substituted in the N<sup>6</sup>, 8 and/or 2 position. Most of them were more active than the parent nucleotide in several different hormonal tests. The synthesis of new potent and phosphodiesterase resistant derivatives of cAMP was very useful in the study of the mechanism of action of 'second messengers' and opened up a new route in the study of possible therapeutic applications.

E. CAMPAIGNE (USA) reported on the synthesis of a number of bioisosters of the indole messenger substances, having the indole nitrogen-hydrogen group replaced by NCH<sub>3</sub>, S, CH<sub>2</sub> or O and on their biological activities.

The most interesting results had been obtained with substitution of a sulfur atom for the indole nitrogen, which provided compounds of quite similar activity in the tryptamine and serotonin series, but impaired peripheral activity and greater lipid solubility.

The synthesis of several analogues of the S-peptide associated with the S-protein in the Ribonuclease-S' molecule were reported by E. SCOFFONE (Italy). The structural elements responsible for the noncovalent specific binding of S-peptide to S-protein had been determined.



On the third topic concerning physicochemical properties and biological action, J. C. MEUNIER (France) discussed the isolation and characterization of free receptor protein from the electric organ of *Electrophorus electricus* membrane fragments. Using pure snake venom  $\alpha$ -toxin from *Naja nigricollis* as a specific reagent of the cholinergic receptor, several properties of the receptor protein were determined. Reintegration of the soluble receptor protein into membrane fragments was also demonstrated.

A. CAMMARATA (USA) discussed the application of solution theory to an analysis of erythrocyte haemolysis. This analysis correlated well with *n*-octanol:water partition studies and indicated that this theoretical approach might have wide application to other biological systems.

The importance of the preferred conformation of a drug molecule in the critical events occurring at the receptor site were studied by L. B. KJER (USA). Using molecular orbital techniques several important biological insights into structure-activity relations were learned.

On a further application of molecular orbital studies, W. BROCK NEELY (USA) examined the activity of several styrene-based herbicides. These were used to explain and make predictions of structures possessing greater activity.

The final three papers were examples of the use of the Hansch-type structure activity analysis. W. P. PURCELL (USA) discussed the electronic (experimental dipole and calculated molecular orbital indices) and the hydrophobic factors of a series of *N,N*-diethyl-3-(dimethylphenylammonium)-propionamide iodides with the inhibition against electric eel acetyl-cholinesterase. W. TH. NAUTA (Netherlands) correlated the partition coefficients with the antihistamic activity of a series of diphenhydramines. In general the  $pA_2$  values against histamine were 0.8 higher in the 4-methyl substituted benzhydryl series than in the unsubstituted series.

J. K. SEYDEL (Germany) referred to the relations between several physicochemical factors and the antimicrobial activity of a series of sulfonamides. The rate determining step in both cell free and whole cells was found to be similar. The pharmacokinetics of protein binding was found to be dependent on  $\pi$ . This allowed the synthesis of sulfonamides possessing certain kinetic characteristics.

Ample space was devoted to discussions, which were wideranging and lively, with exchanges of ideas and suggestions. The main lectures and the special contributions would be published separately, the former in the IUPAC journal *Pure and Applied Chemistry*, the latter in a separate volume that would be published by Butterworths (London) at the same time.

P. PRATESI

# FORTHCOMING IUPAC-SPONSORED SYMPOSIA

## INTERNATIONAL SYMPOSIUM ON SELECTIVE ION-SENSITIVE ELECTRODES

Cardiff, 9-12 April 1973

This Symposium will be held at the University of Wales Institute of Science and Technology (UWIST) in Cardiff. Cardiff has good road and rail connections with London (2-2.5 hours) and with other major cities. Participants travelling direct to Cardiff from London (Heathrow) Airport may find it convenient to use the special British Rail Coach/Rail Service from Heathrow via Reading. There are flights to Glamorgan Airport at Rhose (8 miles from Cardiff) from various parts of UK and from Paris and Dublin—but *not* from London.

### Programme

The programme will be devoted to all aspects of selective ion-sensitive electrodes and will include attention to development, operation, mechanism, and applications.

The following plenary lectures will be delivered:

E. PUNGOR (Hungary)	Precipitate-based Selective Ion-sensitive Electrodes—Theory and Application
G. A. RECHNITZ (USA)	Interplay between Mechanistic Understanding and Development of Selective Ion-sensitive Electrodes
W. SIMON (Switzerland)	Carrier Antibiotics and Model Compounds as Components of Selective Ion-sensitive Electrodes
R. G. BATES (USA)	Ion Activity Scales for Use with Selective Ion-sensitive Electrodes
J. H. RISEMAN (USA)	Analytical Aspects of Potentiometric Chemical Sensing Electrodes

Contributed papers will be presented and discussed under the following subject headings:

1. New electrodes including reference electrodes
2. Interference and mechanism studies
3. Activity-concentration problems
4. General applications
5. Applications to the study of chemical equilibria, including stability constants
6. Applications in the medical and biological fields
7. Applications to online and general control of processes

### Presentation of Papers

The plenary lectures will be given in English and one hour has been allowed for each lecture. For the contributed papers, the time for presentation is 20 minutes followed by 5 minutes discussion. The organizers prefer that the contributed papers should be presented in English.

## Abstracts and Publications

Abstracts of the contributed papers will be offset and a bound collection will be distributed to active participants at the registration desk. This bound collection will be available for purchase after the Symposium for nonparticipants and for participants who wish to purchase additional collections. The plenary lectures will be published later in *Pure and Applied Chemistry*, the official journal of IUPAC, and also made available as a specially bound reprint.

## Correspondence

All correspondence should be addressed to the Symposium Secretary:

Mr. D. R. HUB  
Organizer of Short Courses, UWIST  
King Edward VII Avenue  
Cardiff CF1 3NU, UK

## IV INTERNATIONAL CONFERENCE ON SOLID COMPOUNDS OF TRANSITION ELEMENTS

Geneva, 9-13 April 1973

The first meeting in this series was held in Paris-Orsay in 1965. Since then it has become an established tradition to hold a conference in the series every 2 or 4 years. The II Conference was held at the Technical University of Twente in Enschede, Netherlands, in June 1967 and the III Conference took place at the University of Oslo in June 1969.

The present Conference is a supplement to the more general ones on crystallography, magnetism, semiconductors, *etc.* Like the preceding ones, it will be concerned with the physical and chemical properties of solid compounds of transition elements, especially those containing sulphur, selenium, tellurium, nitrogen, phosphorus, arsenic, antimony, and bismuth. The aim is to bring together chemists and physicists who are actively contributing to our knowledge and understanding of the structural, electrical, magnetic, thermodynamic, and other relevant physicochemical properties of these compounds.

In addition to contributed papers, some invited papers will also be included. All sessions will take place in the amphitheatre of the Institute of Physics of University of Geneva.

Further information may be obtained from:

Prof. E. PARTHÉ  
Chairman of Organizing Committee  
IV International Conference on  
Solid Compounds of Transition Elements  
Laboratoire de Cristallographie  
aux Rayons X  
Université de Genève  
32 boulevard d'Yvoy  
CH-1211 Genève 4  
Switzerland



## **VI INTERNATIONAL CONFERENCE ON ORGANOMETALLIC CHEMISTRY**

**Amherst, Massachusetts, 12-17 August 1973**

The first meeting in this series was held at the University of Cincinnati in 1963, with subsequent biennial conferences in Madison, Wisconsin (1965), Munich (1967), Bristol (1969), and Moscow (1971). Although these Conferences have grown considerably in size and stature during the past decade, their primary purpose remains the same, namely, to promote the exchange of ideas and research findings of persons interested in the many aspects of organometallic chemistry. Since 1965, the Conferences have become truly international.

The VI Conference will take place in the Murray D. Lincoln Campus Center, University of Massachusetts, a superb new twelve-story, air-conditioned facility designed to serve as a centre for conferences of this type. Amherst is a small college and university town located in scenic Western New England (the highly successful Gordon Research Conferences are held in nearby New Hampshire). The Conference dates have been selected at a time when most persons in academic institutions and industrial organizations in USA and other countries are generally free to attend symposia. New England weather is generally excellent during this period. Ample recreational facilities are available in the Amherst area.

### **Scientific Programme**

An International Advisory Committee has been established to assist in the planning, publicity, and programme of the Conference. A number of invited major lectures by distinguished scientists dealing with research in organometallic chemistry and related topics will be presented. Contributed papers representing all aspects of pure and applied organometallic chemistry will be welcomed, although the number of these which can be presented orally may have to be restricted, due to time limitations. After all abstracts (due before 15 May 1973, submitted in English) have been carefully considered by the Committee, invitations to present contributed papers will be issued. A number of social events and excursions are planned, and postconference trips to Boston and New York City are being contemplated for foreign participants who might be interested.

### **Procedure for Preregistration**

Persons who are interested in receiving further details of the Conference, including final registration forms, housing information, list of major speakers and topics, social programme, and instructions for preparing and submitting abstracts should write to:

Prof. M. D. RAUSCH, Chairman  
VI International Conference on Organometallic Chemistry  
University of Massachusetts  
Amherst  
Massachusetts 01002, USA

## **INTERNATIONAL SYMPOSIUM ON MICROCHEMICAL TECHNIQUES**

**Pennsylvania State University, 19-24 August 1973**

*Progress and Projections for Microchemistry* will be the general theme for this Symposium, organized at University Park, University of Pennsylvania, by the American Microchemical Society.

The scientific programme will consist of sessions dedicated to topics of current interest, general papers, discussion groups, practical demonstrations, an equipment exhibit, and will also include a number of instructional workshop sessions. Special sessions will be included on such topics as:

Automated Elemental Analyzers—Ten Years Later

Computers in Elemental Analysis

Organic Elemental Analysis: New Methods and Equipment

Environmental Microanalysis: New Sensors and Techniques

Microelectrodes

Forensic Analysis: Narcotics and Drugs of Abuse

Organic Functional Group Analysis: New Directions

Electroanalytical Advances, including Ion-selective Electrodes

Microscale Separations: Advances in Techniques and Methods

Standards and Standardization for Microchemistry and Microanalysis

Trace Analysis: Advances in Organic and Inorganic Analysis

New Techniques in Microchemistry

Persons interested in presenting a paper under any of the above topics, or a paper on the general topic of microchemistry, should submit their paper to:

Mr. H. J. FRANCIS, JR.

Pennwalt Corp.

900 First Avenue

King of Prussia

Pennsylvania 19406, USA

Included in the programme of scientific presentations will be classroom workshops on the topics of:

Applications of Ion-selective Electrodes

Theory and Applications of Thermal Methods of Analysis

A number of semitechnical and social events are planned, including an evening demonstration of gadgets and an evening session on *The Art of Presenting a Paper*.

## **SYMPOSIUM ON CONTRIBUTION OF CHEMISTRY TO FOOD SUPPLIES**

**Hamburg, 29-31 August 1973**

The topics will show the role of chemistry for food safety—including determination and control of nonagricultural contaminants in food—and food production—including chemical synthesis and modification of food ingredients, such as proteins, fats, and carbohydrates, areas of common interest between the Applied Chemistry Division of IUPAC and IUFOST who will cosponsor the meeting.

The following programme details relate to invited papers:

*Wednesday, 29 August*

Opening Session, including paper on *International Science and Development*

H. EGAN (UK) IUPAC Programme in Relation to Food Supplies

Session on Chemical Modification of Food

J. W. E. COENEN (Netherlands) Chemical Modification of Fats

K. HEYNS (Germany) Chemical Modification of Carbohydrates

M. PYKE (UK) Synthesis of Proteins

M. G. J. BEETS (Netherlands) Odour, Perception, and Chemical Configuration

*Thursday, 30 August*

Session on Contaminants in Food

J. C. AYRES (USA) Mycotoxins

H. FISCHBACH and E. O. HAENNI (USA) Trace Polynuclear Aromatic Hydrocarbon Analysis

A. E. WASSERMAN (USA) Trace Nitrosamine Analysis

*Friday, 31 August*

Session on Development and Evaluation of New Proteins

J. HAWTHORN (UK) New Protein Processes

A. D. ODELL (USA) Structure by Textile Technique

T. WATENABE (Japan) Research and Development on New Protein Foods in Japan

O. B. SMITH (USA) Structure by High Pressure Extrusion

N. S. SCRIMSHAW (USA) Appraisal of Nutritional Significance of New Proteins

J. McL. PHILP (UK) Assessing the Safety in Use of New Proteins

W. MANSON (UK) Chemical Properties of New Proteins in Relation to Structural Possibilities

Session on Informal Practical Evaluation of New Foods by Symposium participants

There will be no official Symposium language but all the invited lectures will be in English as will all literature pertaining to the Symposium. The main papers will be published after the meeting as a Symposium volume. Preprints will not be issued but all participants will receive abstracts of contributed papers.

### **Contributed Papers**

A limited number of submitted papers will also be considered for presentation by the Programme Committee. Summaries (200-300 words) should be sent as soon as possible to Dr. A. J. COLLINGS (see below). Publication of submitted papers can be considered if the full text is received by 31 May 1973.

### **Accommodation and Travel Arrangements**

Participants will be accommodated in hotels in the city of Hamburg. Special travel arrangements are being negotiated. The scientific programme will take



place in University of Hamburg. All correspondence relating to the meeting should be addressed to:

Dr. A. J. COLLINGS  
Environmental Safety Division  
Unilever Research Laboratory  
Colworth House, Sharnbrook  
Bedfordshire, UK

## **XXIV IUPAC CONGRESS**

### **Hamburg, 3-8 September 1973**

Full details of the plenary and section lectures have now been announced by the Organizing Committee:

#### *Section 1 High Polymers*

Plenary lecture—

- G. J. SMETS (Belgium)     Some New Polymers, their Syntheses and their Properties

Section lectures—

##### **1. Kinetics and Mechanism of Polyreactions**

- O. F. OLAY (Austria)     Main Features of the Kinetics of Polyreactions  
J. P. KENNEDY (USA)     Carbenium Ion Polyreactions

##### **2. Structure and Properties of High Polymers**

- E. BAER (USA)     Structure and Properties of Polymeric Solids under High Pressure  
R. KOSFELD (Germany)     Conformation and (Internal) Flexibility of Macromolecules

##### **3. Thermodynamics of High Polymers**

- TH. G. SCHOLTE  
(Netherlands)     Determination of Thermodynamic Quantities of Solutions of High Polymers with the Help of Light Scattering and Equilibrium Ultracentrifugation  
W. H. STOCKMAYER  
(USA)     Some Problems in the Statistical Mechanics of Chain Conformation

##### **4. New Developments**

- G. DALL'ASTA (Italy)     Synthesis and Transformation of Polymers through Metathesis and Structure of Catalysts for Metathesis  
N. G. GAYLORD (USA)     Polymerization of Polymer-induced Comonomer Charge Transfer Complexes  
G. MANECKE  
(Germany)     Some Organic Semiconducting Polymers

##### **5. Inorganic High Polymers**

- W. NOLL (Germany)     Inorganic High Polymers

#### *Section 2 Chemistry of Organic Natural Products*

Plenary lecture—

- F. SANGER (UK)     Sequences in Nucleic Acids

Section lectures—

1. Chemistry of Nucleic Acids and Nucleotides
  - H. G. KHORANA (USA) Synthesis of Deoxynucleic Acids
  - CH. WEISSMANN (Switzerland) Structure and Function of a Viral RNA
  - H. G. ZACHAU (Germany) Structure-Function Relationships in Transfer Ribonucleic Acids
2. Antibiotics and Mycotoxins
  - YU. A. OVCHINNIKOV (USSR) Macrocyclic Depsipeptide Antibiotics and Transmembrane Ion Transport
  - G. BÜCHI (USA) Chemistry of Some Mycotoxins
  - S. SHIBATA (Japan) Anthraquinonoid Mycotoxins
3. Chemistry of Lipids and Prostaglandins
  - D. A. VAN DORP (Netherlands) Essential Fatty Acids and Prostaglandins
  - L. L. M. VAN DEENEN (Netherlands) Phospholipids
  - D. SHAPIRO (Israel) Approaches to the Synthesis of Gangliosides
4. Problems of Nitrogen Fixation
  - E. E. VAN TAMELEN (USA) An Organic-inorganic System for Chemical Modification of Molecular Nitrogen under Mild Conditions

*Section 3 Solid-state Chemistry*

Plenary lecture—

- N. B. HANNAY (USA) Recent Advances in Solid-state Chemistry

Section lectures—

1. Elementary Processes of Material Transport involving Inorganic Solids
  - A. B. LIDIARD (UK) Atomic and Ionic Transport in Crystalline Solids
  - R. L. COBLE (USA) Diffusion Transport in Powder Processing
2. Principles of Preparative Solid-state Chemistry
  - J. C. JOUBERT (France) Hydrothermal Synthesis of New Dense Phases of Transition Metal Oxides and Hydroxides under Very High Pressure (100 Kbar) and High Temperature (1500°C) Conditions
  - R. F. BREBRICK (USA) Thermodynamics and Preparation of Non-stoichiometric, Nonmetallic Compounds
  - Synthesis and Properties of Phosphate Materials
3. Inorganic Structural Chemistry
  - ST. ANDERSSON (Sweden) Aspects of the Principles of Structure and Synthesis of Oxide or Oxide-like Compounds formed by Transition Elements of Groups IV, V, and VI of the Periodic Table
  - A. KJEKSHUS (Norway) Current Problems concerning Structural Chemistry of Transition Metal Pnictides and Chalcogenides
  - E. PARTHÉ (Switzerland) Application of Valence Electron Concentration in Crystal Chemistry

J. PORTIER (France)	Crystal Chemistry and Magnetic Properties of Fluorides and Oxyfluorides of 3d Transition Elements
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#### *Section 4 Compounds of Nonmetals*

##### Plenary lecture—

R. SCHAEFFER (USA)	Recent Advances in Structural Chemistry of Nonmetals
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##### Section lectures—

##### 1. Compounds of Boron and Silicon

H. NOETH (Germany)	New Results and Aspects of Boron Chemistry
P. L. TIMMS (UK)	Developments in Boron and Silicon Subhalide Chemistry
M. G. VORONKOV (USSR)	Advances in Chemistry of Biologically Active Organosilicon Compounds
R. A. BENKESER (USA)	Chemical Properties of the Si-H Bond

##### 2. Compounds of Phosphorus

F. H. WESTHEIMER (USA)	Mechanisms of Hydrolysis of Phosphates and Related Compounds
R. F. HUDSON (UK)	Reactivity of Heterocyclic Phosphorus Compounds

##### 3. Compounds of Sulfur

O. FOSS (Norway)	Aspects of the Structural Chemistry of Polythionates
F. G. BORDWELL (USA)	Sulfur Groupings as Mechanistic Probes

##### 4. Compounds of the Halogens

K. O. CHRISTIE (USA)	Halogen Fluorides
R. J. GILLESPIE (Canada)	Halogen Cations

#### *Section 5 Applied Electrochemistry*

##### Plenary lecture—

M. FLEISCHMANN (UK)	Some Engineering Aspects of Electrosynthesis
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##### Section lectures—

##### 1. Electrochemical Engineering

F. GOODRIDGE (UK)	Recent Developments in Design of Electrolytic Cells
N. IBL (Switzerland)	Fundamentals of Electrochemical Engineering: Role of Transport Phenomena

##### 2. Electrochemical Energy Conversion

W. VIELSTICH (Germany)	Electrochemical Energy Conversion with the Help of Fuel Cells and Metal-Air Cells
F. VON STURM (Germany)	Electrocatalysts in Power-generating Cells

##### 3. Organic and Inorganic Electrochemistry

F. BECK (Germany)	Organic Electrosynthesis in the Capillary Gap Cell
L. EBERSON (Sweden)	Organic Synthesis by Anodic Oxidation—Uses and Limitations
G. CAUQUIS (France)	Why Organic Solvents are so Interesting in Organic and Inorganic Electrochemistry



L. GIERST (Belgium)      Electrochemical Oxygen Ionization—Catalysis and Inhibition

4. Electrochemical Surface Treatment  
Y. M. KOLOTYRKIN      Electrochemical Surface Treatment  
(USSR)

### *Section 6 Radiochemistry*

Plenary lecture—

G. T. SEABORG (USA)      Status Report on the Transuranic Elements

Section lectures—

1. Chemical Technology of Nuclear Fuels  
D. E. FERGUSON (USA)      Chemical Reprocessing of Nuclear Fuels  
W. STOLL (Germany)      Preparation of Fuel Elements
2. Transuranic Elements  
A. GHIORSO (USA)      Studies on the Heaviest Elements at Berkeley  
I. ZVARA (USSR)      Studies on the Heaviest Elements at Dubna  
V. I. SPITZYN (USSR)      Chemical Research on the Actinide Elements
3. Modern Trends in Preparation of Radionuclides and Labelled Compounds  
A. P. WOLF (USA)      Labelling of Compounds with Short Lived Nuclides and their Application
4. Nuclear Applications to Technological and Environmental Problems  
K. LJUNGGREN      Nuclear Applications to Technology  
(Sweden)  
G. B. COOK (Austria)      Nuclear Applications to Environmental Problems

### *Section 7 Symposium on Information and Communication in Chemistry*

L. C. CROSS (UK)      Primary Literature in the Future  
A. I. MICHAILOV      Means of Communication in Chemistry: Yesterday, Today, and Tomorrow  
(USSR)  
—      International Problems and Tasks for Chemical Information and Documentation

In addition to the above general scientific programme of the Congress, the following joint symposia will be held:

1. *Polypeptide Hormones and Releasing Factors*  
by the Medicinal Chemistry Section of the Organic Chemistry Division of IUPAC—  
R. SCHWYZER      One Dimensional Organization and Readout  
(Switzerland)      Mechanism of the Biological Information of Hormones of the Hypophysis  
H. D. NIALL (USA)      Growth Hormone and Lactogenic Hormones  
E. WERLE (Germany)      Tissue Hormones with Particular Respect to those of the Kinin- and Angiotensin-Systems  
A. V. SCHALLY (USA)      Physiological, Veterinary and Clinical Effects of Hypothalamic Releasing Hormones, especially LH-RH
2. *Modern Methods for Treatment of Waste Water in Theory and Practice*  
by the Water Quality Section of the Applied Chemistry Division of IUPAC—

- (i) Flocculation Processes and Use of Precipitation and Sludge Dewatering Aids  
Main lecture by J. C. BOEGLIN (France)
- (ii) Combined Chemical-biological Treatment Systems  
Main lecture by H. O. BOUVENG (Sweden)
- (iii) Adsorption Processes  
Main lecture by W. J. WEBER, JR. (USA)
- (iv) Ion Exchange and Membrane Processes  
Main lectures by CHR. OEHME (Germany)—Ion Exchange  
D. C. SAMMON (UK)—Membrane Processes

### **Correspondence**

All correspondence concerning the Congress should be addressed to:

General Secretariat of XXIV IUPAC Congress  
Dr. W. FRITSCHÉ  
c/o Gesellschaft Deutscher Chemiker  
Postfach 119075  
D-6000 Frankfurt/Main 8  
Germany

## **VI INTERNATIONAL MASS SPECTROMETRY CONFERENCE**

**Edinburgh, 10-14 September 1973**

The Conference is being organized by an International Committee, comprising representatives from the following countries: Belgium, Czechoslovakia, France, Germany, Italy, Japan, Netherlands, Sweden, UK, USA, USSR, and Yugoslavia.

Papers are solicited under the following general headings:

Ionization Processes  
Life Sciences  
Structure of Organic Ions  
Diagnostic Mass Spectrometry for Kinetics  
Negative Ions  
High Temperature Studies of Inorganic Substances  
Ion Molecule Reactions  
Surface and Ion Reactions  
Information Theory (pattern recognition)  
New Instrumentation

An exhibition of equipment and literature is planned in conjunction with this Conference. Further details regarding the conference, exhibition, and social functions, can be obtained from:

C. H. MAYNARD  
Administrative Secretary  
Institute of Petroleum  
61 New Cavendish Street  
London W1M 8AR, UK

# INTERNATIONAL SYMPOSIUM ON MACROMOLECULES

Aberdeen, 10-14 September 1973

The meeting will take place at University of Aberdeen.

## Scientific Programme

It is planned to emphasize the relationship between the science and technology of polymers. The programme will be arranged in the following two main sections, running in parallel throughout the meeting:

Synthesis and Manufacture

Physical and Technological Aspects

Each section will consist of a limited number of symposium and invited lectures plus contributed papers.

Contributed papers are invited, and the Programme Committee will consider papers of special interest and novelty in relation to the following topics with major emphasis on thermoplastic polymers and elastomers, and in particular the relationship between any of these topics:

*Manufacture of Polymers*

*Synthesis of Polymers*

*Science and Technology of Fluid Polymers*

*Science and Technology of Solid Polymers*

(for further details see *Information Bulletin* No. 41, November 1971, page 61)

## Publication

No preprints will be issued, but abstracts of symposium lectures and contributed papers will be available to all registered participants. The invited lectures which will be published in *Pure and Applied Chemistry*, are as follows:

J. P. HOGAN (USA)	The Phillips Polyethylene Process
G. ALLIGER (USA)	Liquid Systems for Rubber Products including Tyres
G. SMETS (Belgium)	Chemical Reactions in Polymeric Systems
C. S. MARVEL (USA)	New Thermally Stable Adhesive Resins
C. G. OVERBERGER (USA)	Synthesis and Properties of Asymmetric Polymers
T. SAEGUSA (Japan)	Polymerization and Cyclopolymerization of 2-Oxazoline
D. THEISEN (Germany)	Development and Application of trans 1,5 Poly-pentamer (TPR)
G. BURNETT (UK)	Problems in Cross Linking
G. V. VINOGRADOV (USSR)	Fundamental Problems concerning Interrelation of Polymer Structures and their Rheological Properties in the Fluid State
G. ALLEN (UK)	Neutron Scattering Studies of Selfdiffusion in Rubbers and Polymeric Melts
A. PETERLIN (USA)	Influence of Morphology on Transport of Liquids, Vapours, and Gases in Crystalline Polymers



P. MEARES (UK)	Towards a Molecular Interpretation of Material Transport in Polymers
W. W. FISCHER and G. WEGNER (Germany)	Crystal Structure and Morphology of Polymers from Solid-state Reactions
J. G. WILLIAMS (UK)	Fracture Mechanics of Graze Growth in Polymers
A. M. NORTH (UK)	Some Relaxation Studies of Environmental Effects in Solid Polymers
E. H. ANDREWS (UK)	Morphology and Mechanical Properties in Semicrystalline Polymers
G. REHAGE (Germany)	Elastic Properties of Crosslinked Polymers
S. S. STERNSTEIN (USA)	Viscoelastic Behaviour and Yielding Processes of Glassy and Composite Polymers in Multiaxial Stress States
A. KELLER (UK)	Chain Orientation and Crystallization
R. KONINGSVELD (Netherlands)	Compatibility of Polydisperse Polymers
H. BENOIT (France)	Block Copolymers—Structure and Properties

### **Symposium Languages**

The symposium and invited lectures will be given in English. Contributed papers may be presented in any language, but the organizers suggest that speakers should use a language (preferably English) that is commonly understood by most participants. The Symposium literature will be published in English.

### **Correspondence**

All correspondence relating to the meeting should be addressed to:

Dr. J. F. GIBSON  
Chemical Society  
Burlington House  
Piccadilly  
London W1V 0BN  
UK

## **INTERNATIONAL SYMPOSIUM ON PORE STRUCTURE AND PROPERTIES OF MATERIALS**

**Prague, 18-21 September 1973**

This Symposium is being organized, under the joint sponsorship of RILEM and IUPAC, by the Building Research Institute of the Technical University of Prague in conjunction with the Czechoslovak Scientific and Technical Society, Working Group for Porosimetry of the Czech Building Society, Czech Silicate Society, and Czech Society for Industrial Chemistry.

Pore structure plays a decisive role in the use of many materials in various areas of industry—chemistry, building, ceramics, metallurgy, agriculture, extraction industries, *etc.*, and its characteristics determine such important

properties as the mechanical and physical properties of materials, mass and heat transport, acoustic properties, electrical properties, problems of durability, *etc.* It is, therefore, a matter of interest to both academic research scientists and industrial engineers to establish the true connection between the basic pore structure parameters and the properties of porous materials. This Symposium is meant as an interdisciplinary meeting with two objectives: reporting and reviewing current progress, and bringing together workers from the *pure* and *applied* areas. It is hoped that by accommodating under one roof people from various disciplines, better grounds will be established for the coordination of future research, that interdisciplinary activity will be stimulated, and that the facilities will be improved for the application of knowledge of materials in their proper use.

### **Scope of Symposium**

The Symposium will consist of four parts, covering the topics listed below:

#### *Pore Structure*

Models and geometry of pore structure

Methods of determination of pore structure

(adsorption, diffusion, permeametry, mercury penetration, microscopy, *etc.*)

#### *Relations between Pore Structure and Properties of Materials*

Mechanical properties

(strength, deformation behaviour, *etc.*)

Physical properties

(mass and heat transport, also accompanied by a chemical reaction, acoustic properties, problems of durability, *etc.*)

### **Papers and Discussions**

Reports should cover the results of studies issuing from original completed researches in connection with the specified subject of the Symposium. General Reports will be prepared by General Reporters giving a critical analysis of the individual reports on the subjects concerned. General Reporters will further present an exhaustive survey of the present state of knowledge in their field including data not mentioned in the individual reports within their sessions, and will outline the perspective general lines of future research. Communications should contain in a short form new results of research studies and also of those under progress. Discussions will follow as time permits after the oral presentation of communications.

The official languages will be English, French, Czech, and Russian. Provision is being made for simultaneous translation among these languages.

### **Correspondence**

All correspondence relating to the Symposium should be addressed to:

Symposium RILEM/IUPAC 1973—Ing. S. MODRY  
Building Research Institute  
Technical University of Prague  
Solinova 7  
Prague 6—Dejvice  
Czechoslovakia

## **IV INTERNATIONAL CONFERENCE ON CRYSTAL GROWTH**

**Tokyo, 24-29 March 1974**

### **Purpose and Scope**

The purpose of the Conference is to further the science and art of crystal growth by providing a forum for reporting and discussing recent original research in the field. In addition to a limited number of invited talks on major topics, the Organizing Committee invites contributions from any person working in the field of crystal growth. The following categories will be included:

- (i) Theoretical and experimental studies of molecular mechanisms and transport processes in crystal growth, and of related phenomena such as external morphology of crystals, structures and properties of dispersed phases, *etc.*
- (ii) Perfection and physical properties of crystals as related to the growth process
- (iii) Growth processes of crystals of metals and nonmetals, including polymers and biological crystals. The growth processes are subdivided into (a) vapour growth, (b) solution and flux growth, (c) melt growth, (d) solid-state crystallization, (e) electrochemical deposition, (f) growth at high temperature and/or pressure, (g) growth of polymer and biological crystals, and (h) growth of natural crystals
- (iv) Thin films; nucleation, growth and epitaxy
- (v) New methods and techniques of growing single crystals
- (vi) Industrial bulk crystallization
- (vii) Research and educational cine films relating to the science and art of growing crystals
- (viii) Other topics directly related to growth process

### **Contributed Papers**

An appropriate number of papers will be selected by the Programme Committee from those submitted to the Conference Secretariat for presentation at the Conference. Summaries of up to 500 words should be received by the Conference Secretariat by 15 September 1973. Notice will be mailed to the authors of accepted contributions by 15 October 1973. At that time, the authors will receive instructions for the preparation of short abstracts to be included in the Collected Abstracts. Short abstracts should be submitted to the Conference Secretariat not later than 30 November 1973.

### **Proceedings**

The Proceedings of the Conference will be published as a regular issue of *Journal of Crystal Growth*, of which the charge is included in the registration fee. Authors of accepted contributions are invited to submit their manuscripts for the Proceedings to the Conference Secretariat by 30 November 1973. The manuscripts will be refereed in accordance with the usual standards of *Journal of Crystal Growth*. Their inclusion in the Proceedings is not automatic. Editors and an Editorial Committee responsible for refereeing papers for the Proceedings will be nominated later on an international basis.



## **Languages**

Although contributions in English, French, German, and Russian are acceptable, it is recommended to use English for the preparation of abstracts and for the oral presentation, because of linguistic difficulties for domestic participants. A simultaneous translation service will not be provided during the Conference.

## **Conference Secretariat**

All correspondence concerning the Conference should be addressed to:

Conference Secretariat  
Organizing Committee, ICCG-4  
Science Council of Japan  
7-22-34 Roppongi, Minato-ku  
Tokyo, 106 Japan

## **Related Meetings**

The International Vacuum Congress and International Conference on Solid Surfaces will be held from 25-29 March in the International Conference Hall in Kyoto. Sessions of thin films will be arranged in the early half of ICCG-4, and in the later half of IVC and ICSS, so that those interested in thin films may attend both meetings.

The II International Spring School on Crystal Growth will be held immediately prior to or after ICCG-4, at a resort place near Tokyo. Interested persons may contact:

Prof. R. UEDA  
Chairman, ISSCG-2 Committee  
Department of Applied Physics  
School of Science and Engineering  
Waseda University  
4-170 Nishi-Ookubo, Shinjuku-ku  
Tokyo 160, Japan

## **XVI INTERNATIONAL CONFERENCE ON COORDINATION CHEMISTRY**

**Dublin, 19-24 August 1974**

The Conference will be held at University College, Dublin and Trinity College, Dublin. The majority of the scientific sessions will be held at the University College campus at Belfield.

## **Scope**

The Conference will be concerned with recent developments of coordination chemistry in the following fields:

- (i) Biological aspects of coordination chemistry
- (ii) Physical methods and bonding
- (iii) Inorganic reaction mechanisms
- (iv) Reactions of coordinated ligands including catalysis

- (v) Coordination chemistry of the solid state
- (vi) Coordination chemistry in the environment

### **Scientific Sessions and Papers**

Parallel sessions will be held. A number of plenary lectures as well as some session lectures will be given by invited speakers. In addition about 140 papers will be presented. Because it is anticipated that the number of offered papers may exceed the number that can conveniently be presented, a selection may be made by the Executive Committee if necessary. For each paper 20 minutes will be available with an additional 10 minutes for discussion.

### **Submission of Papers**

A date for submission will be announced later. To allow the selection and grouping of papers and the printing of abstracts the date for submission is likely to be towards the end of 1973.

### **Publications**

Abstracts of the scientific contributions will be printed as *Proceedings of XVI ICCC*. Plenary lectures will be published in the IUPAC journal *Pure and Applied Chemistry*.

### **Language**

The official language of the Conference will be English. Although there is no argument against the use of any other language, it is recommended that papers be presented in English. Translation facilities will not be available. Speakers in other languages are recommended to distribute a written text in English at the presentation of their contribution.

### **Correspondence**

All correspondence concerning the Conference should be addressed to:

Dr. W. J. DAVIS  
Secretary, XVI ICCC  
Chemical Laboratory  
Trinity College  
Dublin 2  
Ireland

## FINAL REPORTS FROM IUPAC

The following Final (Definitive) Reports have been published in *Pure and Applied Chemistry* during 1972:

A Guide to Procedures for the Publication of Thermodynamic Data (Commission on Thermodynamics and Thermochemistry): **29** (1-3), 395-408.

Erreurs en Microanalyse organique élémentaire (Commission des Methodes microchimiques et d'Analyse des Traces)—I: **29** (1-3), 409-492; —II: **29** (4), 629-686; —III: **30** (1-2), 301-334

Catalogue of Physicochemical Standard Substances (Commission on Physicochemical Measurements and Standards): **29** (4), 597-616

Recommendations on Ion Exchange Nomenclature (Commission on Analytical Nomenclature): **29** (4), 617-624

Recommendations for the Presentation of NMR Data for Publication in Chemical Journals (Commission on Molecular Structure and Spectroscopy): **29** (4), 625-628

Atomic Weights of the Elements 1971 (Commission on Atomic Weights): **30** (3-4), 637-650

\*Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis—I: General Atomic Emission Spectroscopy (Commission on Spectrochemical and other Optical Procedures for Analysis): **30** (3-4), 651-680

Nomenclature of Inorganic Boron Compounds (Commission on Nomenclature of Inorganic Chemistry): **30** (3-4), 681-710

\*Definitive Rules for Nomenclature of Steroids (Commission on Nomenclature of Organic Chemistry and IUPAC-IUB Commission on Biochemical Nomenclature): **31** (1-2), 283-322

Analysis of Interlaboratory Measurements on the Vapor Pressure of Gold [**31** (3), 371-394] and of Cadmium and Silver [**31** (3), 395-432] (Commission on High Temperatures and Refractory Materials)

\*Definitions, Terminology, and Symbols in Colloid and Surface Chemistry—I (Commission on Colloid and Surface Chemistry): **31** (4), 577-638

A One-letter Notation for Amino Acid Sequences (IUPAC-IUB Commission on Biochemical Nomenclature): **31** (4), 639-646

Definitive Rules for Naming Synthetic Modifications of Natural Peptides (IUPAC-IUB Commission on Biochemical Nomenclature): **31** (4), 647-654

Reprints of Reports marked \* may be purchased from the IUPAC Secretariat (for full details see *Information Bulletin* Nos. 42/43, July 1972, pp. 74-75)



# CALENDAR OF IUPAC-SPONSORED MEETINGS

1973

April 9-12	International Symposium on Selective Ion-sensitive Electrodes (Mr. D. R. HUB, Secretary of International Symposium on Selective Ion-sensitive Electrodes, University of Wales Institute of Science and Technology, King Edward VII Avenue, Cardiff CF1 3NU, UK)	Cardiff (UK)
April 9-13	IV International Conference on Solid Compounds of Transition Elements (Prof. E. PARTHÉ, Chairman of Organizing Committee, IV International Conference on Solid Compounds of Transition Elements, c/o Laboratoire de Cristallographie aux Rayons X, Université de Genève, 32 boulevard d'Yvoy, CH-1211 Genève 4, Switzerland)	Geneva (Switzerland)
May 15-17	Conference on Advances and Future of Macromolecular Science (Dr. P. HRDLVIČ, Secretary, Conference on Advances and Future of Macromolecular Science, c/o Polymer Institute, Slovak Academy of Sciences, Dúbravská Cesta—Bratislava, Czechoslovakia)	High Tatras Starý Smokovec (Czechoslovakia)
May 28- June 1	XI European Congress on Molecular Spectroscopy (Dr. T. SALUVERE, Secretary of Organizing Committee of XI-ECMS, c/o Institute of Cybernetics, Academy of Sciences of Estonian SSR, Lenini puistee 10, Tallinn 200 001, USSR)	Tallinn (USSR)
June 25-30	XV International Conference on Coordination Chemistry (Organizing Committee of XV-ICCC, Department of Chemistry, Moscow State University, Lenin Hills, Moscow, USSR)	Moscow (USSR)
July 4-6	IV Canadian Wood Chemistry Symposium (Dr. D. W. CLAYTON, General Chairman, IVth Canadian Wood Chemistry Symposium, c/o Pulp and Paper Research Institute of Canada, 570 St. John's Boulevard, Pointe Claire 720, Quebec, Canada)	Quebec (Canada)
August 12-17	VI International Conference on Organometallic Chemistry (Prof. M. D. RAUSCH, Chairman of Organizing Committee, VI International Conference on Organometallic Chemistry, c/o University of Massachusetts, Amherst, Massachusetts 01002, USA)	Amherst Massachusetts (USA)
August 19-24	International Symposium on Microchemical Techniques—1973 (Mr. H. J. FRANCIS, JR., Pennwalt Corp., 900 First Avenue, King of Prussia, Pennsylvania 19406, USA)	Pennsylvania State University (USA)
August 21-31	XXVII International Conference on Pure and Applied Chemistry (Executive Secretary, IUPAC Secretariat, 2/3 Pound Way, Cowley Centre, Oxford OX4 3YF, UK)	Munich (Germany)
August 29-31	IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies (Dr. A. J. COLLINGS, Environmental Safety Division, Unilever Research Laboratory, Colworth House, Sharnbrook, Bedfordshire, UK)	Hamburg (Germany)

September 3-8	XXIV International Congress on Pure and Applied Chemistry (Dr. W. FRITSCH, Gesellschaft Deutscher Chemiker, Carl-Bosch-Haus, Varrentrappstrasse 40-42, Postfach 119075, D-6000 Frankfurt/Main 8, Germany)	Hamburg (Germany)
September 3-6	III International Conference on Chemical Thermodynamics (Prof. F. KOHLER, Institut für Physikalische Chemie der Universität Wien, Währingerstrasse 42, A-1090 Wien, Austria)	Baden Vienna (Austria)
September 6-10	International Symposium on Plasma Chemistry (Prof. H. SUHR, Chemisches Institut der Universität Tübingen, Wilhelmstrasse 33, Lothar-Meyer-Bau, D-7400 Tübingen, Germany)	Kiel (Germany)
September 10-14	International Symposium on Macromolecules (Dr. J. F. GIBSON, International Symposium on Macromolecules, c/o The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Aberdeen (UK)
September 10-14	VI International Mass Spectrometry Conference (Mr. C. H. MAYNARD, Administrative Secretary, Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK)	Edinburgh (UK)
September 18-21	International Symposium on Pore Structure and Properties of Materials (Ing. S. MODRÝ, Chairman of Organizing Committee, Symposium RILEM-IUPAC 1973, c/o Building Research Institute, Technical University of Prague, Šolínova 7, Praha 6-Dejvice, Czechoslovakia)	Prague (Czechoslovakia)
October	International Congress on Improvement of Chemical Education (Dr. H. FÖCKE, Division of Science Teaching, UNESCO, Place de Fontenoy, F-75 Paris 7 <sup>e</sup> , France)	Warsaw (Poland)
	1974	
March 24-29	IV International Conference on Crystal Growth (Conference Secretariat, Organizing Committee of ICCG-IV, Science Council of Japan, 7-22-34 Roppongi, Minato-ku, Tokyo 106, Japan)	Tokyo (Japan)
June 24-28	IX International Symposium on Chemistry of Natural Products (Prof. J. W. APSIMON, Chairman of Organizing Committee, IX International Symposium on Chemistry of Natural Products, c/o Department of Chemistry, Carleton University, Ottawa, Ontario K1S 5B6, Canada)	Ottawa (Canada)
July 3-9	III International Pesticide Chemistry Congress (Dr. J. LARINKARI, Chairman of Organizing Committee, III International Pesticide Chemistry Congress, c/o Fabianinkatu 7B, POB 13028, SF-00130 Helsinki 13, Finland)	Helsinki (Finland)
July 26-31	International Symposium on Macromolecules (Prof. E. B. MANO, Simpósio Internacional de Macromoléculas, c/o Academia Brasileira de Ciências, Caixa Postal 229, 20.000 Rio de Janeiro, GB, Brazil)	Rio de Janeiro (Brazil)
July	IV International Conference on Nonaqueous Solvents (Prof. V. GUTMANN, Institut für Anorganische Chemie der Technischen Hochschule Wien, Getreidemarkt 9, A-1060 Wien, Austria)	Vienna (Austria)

August 19-24	XVI International Conference on Coordination Chemistry (Dr. W. J. DAVIS, Secretary of Organizing Committee, XVI-ICCC, c/o Department of Chemistry, Trinity College, University of Dublin, Dublin 2, Ireland)	Dublin (Ireland)
September	International Symposium on Macromolecules (Dr. S. GONZALEZ-BABÉ, Secretary of International Symposium on Macromolecules, Instituto de Plásticos y Caucho, c/o Juan de la Cierva No. 3, Madrid 6, Spain)	Madrid (Spain)
September	II Symposium of Inorganic Phosphorus Compounds (Dr. W. WANĚK, Lehrstuhl für Chemie der Pädagogischen Fakultät, České Mládeže 8, Ustí Nad Labem, Czechoslovakia)	Prague (Czechoslovakia)

## CALENDAR OF NON-IUPAC MEETINGS

1973

March 12-15	Symposium über Grenzflächenphänomene in fluiden Systemen (DECHEMA-Sekretariat, Theodor-Heuss-Allee 25, Postfach 970146, D-6000 Frankfurt/Main 97, Germany)	Tutzing am Starnberger See (Germany)
March 15-16	Colloquium on Vitreous and Amorphous Systems (Secrétariat général de la Société chimique de Belgique, 49 square Marie-Louise, B-1040 Brüssel, Belgium)	Brussels (Belgium)
March 26-30	Annual Chemical Congress (Dr. J. F. GIBSON, Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Swansea (UK)
April 3-13	Conference on Education of Teachers for Integrated Science (Miss M. DIETZ, Science Teaching Center, University of Maryland, College Park, Maryland 20742, USA)	University of Maryland (USA)
April 24-28	Emploi des Calculateurs électroniques en Génie chimique (Société de Chimie industrielle, Prof. H. BRUSSET, 80 route de St-Cloud, F-92 Rueil Malmaison, France)	Paris (France)
May 2-4	I Internationales Symposium über Säulen-Flüssigchromatographie (Sekretariat des Schweizerischen Chemiker-Verbandes, Falkenstrasse 12, CH-8008 Zürich, Switzerland)	Interlaken (Switzerland)
June 4-8	III International Specialized Symposium on Yeasts: Metabolism and Regulation of Cellular Processes (Mrs. C. WALLER, Alko, POB 350, SF-00101 Helsinki 10, Finland)	Aulanko (Finland)
June 5-7	Symposium on Mechanisms of Hydrocarbon Reactions (Dr. L. GUCZI, Scientific Secretary to Organizing Committee, c/o Institute of Isotopes, POB 77, Budapest 114, Hungary)	Siófok Lake Balaton (Hungary)
June 5-9	XII International Congress of the Gas Industry (Organizing Committee, 62 rue de Courcelles, F-75 Paris 8°, France)	Nizza (France)
June 11-14	IV International Symposium on Fresh Water from the Sea (Prof. A. DELYANNIS, POB 1199, Athens, Greece)	London (UK)



June 18-20	International Conference on Plastics Industries in a Developing World: Role of Plastics in National Development (Plastics Institute, 11 Hobart Place, London SW1W 0HL, UK)	London (UK)
June 20-27	European Meeting on Chemical Engineering andACHEMA Congress (DECHEMA-Sekretariat, Theodor-Heuss-Allee 25, Postfach 970146, D-6000 Frankfurt/Main 97, Germany)	Frankfurt/Main (Germany)
June 27-29	Conference on Chemical Structure-Biological Activity Relationships (Dr. M. TICHÝ, Institute of Hygiene and Epidemiology, Department of Industrial Hygiene and Occupational Diseases, Šrobárova 48, Praha 10, Czechoslovakia)	Prague (Czechoslovakia)
July 1-7	IX International Congress of Biochemistry (Secretariat, IX International Congress of Biochemistry, c/o Svenska Kemistsamfundet, Wenner-Gren Center, 6 tr, S-113 46 Stockholm, Sweden)	Stockholm (Sweden)
July 10-13	III International Symposium on Synthesis in Organic Chemistry (Dr. J. F. GIBSON, Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Oxford (UK)
July	V International Conference on Science and Society: Scientific, Technological and Social Development—Aims and Values (Udruženje Nauka i Društvo, Organizacioni odbor V međunarodne konferencije, POB 163, Yu-11001 Beograd, Yugoslavia)	(Yugoslavia)
September 22-27	IV International Food Science and Technology Congress (Secretariat, IV International Food Science and Technology Congress, c/o Instituto de Agroquímica y Tecnología de Alimentos, Jaime Roig 11, Valencia-10, Spain)	Madrid (Spain)
September 24-28	V European Congress of Corrosion (Société de Chimie industrielle, 80 route de St-Cloud, F-92 Rueil-Malmaison, France)	Paris (France)
October 1-5	International Congress on Fluidization and its Applications (Société de Chimie industrielle, 80 route de St-Cloud, F-92 Rueil-Malmaison, France)	Toulouse (France)
October 15-17	V. Europäisches Symposium 'Lebensmittel' (Gesellschaft Deutscher Chemiker, Carl-Bosch-Haus, Varrentrappstrasse 40-42, Postfach 119075, D-6000 Frankfurt/Main 90, Germany)	Zürich (Switzerland)

## IUPAC COLLEAGUES DECEASED

<i>Belgium</i>	Prof. H. F. WACHSMUTH (4 June 1972)—Section on Clinical Chemistry
<i>France</i>	Prof. M. LETORT (1 August 1972)—Former President of Physical Chemistry Division
<i>Israel</i>	Prof. A. KATCHALSKY (30 May 1972)—Former Commission on Macromolecules
<i>UK</i>	Prof. J. E. PRUE (16 October 1972)—Commission on Nomenclature of Inorganic Chemistry

Two new supplements from IUPAC published by The Butterworth Group

## **Dissociation Constants of Organic Bases in Aqueous Solution: Supplement 1972**

**D.D. Perrin**

The original table of dissociation constants of organic bases in aqueous solution covered the literature up to the end of 1961. The present table is designed to be used in conjunction with the original table, and therefore the compounds are numbered serially from 4001. The index, which lists more than 7,000 compounds, is a combined one covering the original table as well as the supplement. The new table adheres as closely as possible to the practices and forms adopted in the original table.

The range of published papers that have been examined for the present table is more extensive than for the original, notably because of the inclusion of Russian journals (and their English translations where available), but there remained many values that were accessible only from abstracting journals. These are given without comment, and their sources are indicated in the references.

1972 1,160 pp 0 408 70408 X £22.50 or \$67.50

## **Standard Methods for the Analysis of Oils, Fats and Soaps 5th Edition Incorporating First and Second Supplements**

These supplementary sheets, in loose leaf form, include the following new methods: II.D.7. Iodine value ( $I_1$ ). II.D.17. Determination of di- and tri-unsaturated fatty acids by U.V. spectrophotometry. II.D.20. Determination of epoxy-group oxygen. III.A.2. Determination of arsenic in glycerol (photometric method with silver diethyldithiocarbamate). IV.A.11. Determination of the unsaponified and unsaponifiable matter in soaps. IV.A.12. Determination of minor quantities of glycerol in soaps (photometric method).

There is as usual a complete new contents list incorporating all methods covered to date in this edition.

1973 0 408 70427 6 £2.50 or \$7.50

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**UNESCO**  
**SURVEY OF CHEMISTRY TEACHING**  
**AT THE UNIVERSITY LEVEL**

This survey has been prepared by IUPAC at the invitation of UNESCO with the aim of providing a comparative assessment of university-level courses designed to educate chemists in different regions of the world. Contributors from 22 countries were invited to provide short reports, surveying the situation under three headings – general information, main problems, and new trends. The actual survey was prepared on the basis of these reports and the individual reports are attached as an appendix.

The survey is intended to be illustrative rather than definitive; in the present state of university chemistry teaching, many changes are being considered but few have actually occurred. Thus this presentation of the overall situation will be of real assistance to all those responsible for teaching chemistry at university level.

1972 212 pages

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Three Supplements published for IUPAC by The Butterworth Group  
*The contents of these publications do not appear in Pure and Applied Chemistry*

## **IUPAC Characterization of Chemical Purity: Organic Compounds**

**Edited by L.A.K. Staveley**

This is a monograph prepared under the sponsorship of the IUPAC Commission on Physicochemical Measurements and Standards. It deals with techniques for the determination of chemical purity of organic compounds or of comparatively volatile inorganic compounds, and is intended for those who have either to prepare for themselves the substances for their work or to purify the best materials available commercially and then carry out further experiments to assess the purity of the final product.

The book will be of use not only to those workers engaged in pure research but also to those concerned with the manufacture of chemical substances.

1971 182pp illustrated 0 408 70145 5 £5.00 or \$15.00

## **IUPAC. Selected Constants: Oxidation-reduction Potentials of Inorganic Substances in Aqueous Solution**

**G. Charlot, A. Collumeau and J.C. Marchon**

The aim of these tables is essentially to supply the chemist with a convenient working tool which will enable him to find quickly the best or most probable value of the normal or formal oxidation-reduction potential of a given oxidation-reduction system. From the constants and values given, it is possible to derive the values of the potentials of numerous other oxidation-reduction systems.

This work was prepared within the organization of the Electrochemical Commission of the Analytical Chemistry Division of IUPAC, and forms part of a general plan which also includes publications on solubility products and formation constants of complexes.

1971 80pp 0 408 70177 3 £3.50 or \$10.50

## **IUPAC. Pesticide Terminal Residues - Tel Aviv, 1971**

**Edited by A.S. Tahori**

These are the full twenty-four invited papers from the conference which brought together top specialists in this area of chemistry. With far-reaching implications over many disciplines, and the recent concern with pollution and ecology, these papers will have much that is of interest for ecologists, plant pathologists, entomologists as well as scientists in the pesticide industry all over the world.

1972 374 pp illustrated 0 408 70290 7 £12.00 or \$36.00

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## NEW NOMENCLATURE PUBLICATIONS IN CHEMISTRY

One of the main objects of the International Union of Pure and Applied Chemistry is "to study topics of international importance to pure and applied chemistry which need regulation." Thus IUPAC has a number of permanent commissions whose recommendations on nomenclature are accepted internationally.

### Nomenclature of Organic Chemistry (Blue Book)

Sections A and B -3rd Edition and Section C -2nd Edition

For the first time the IUPAC rules on the nomenclature of organic chemistry have been brought together in one volume, updating the second edition of Sections A and B which appeared in 1966, and Section C which was published in 1965.

1971 352pp illustrated 0 408 70144 7 £8.00 or \$24.00

### Nomenclature of Inorganic Chemistry (Red Book) 2nd Edition

The second edition of IUPAC's "Red Book" revises and extends the previous volume published in 1959. Since then the Commission on Nomenclature of Inorganic Chemistry has been working continuously, and the new edition incorporates many changes and improvements.

1971 122pp illustrated 0 408 70168 4 £2.75 or \$8.25

### Manual of Symbols and Terminology for Physicochemical Quantities and Units (Green Book)

Prepared for publication by M. L. McGlashan, Chairman of the Commission on Symbols, Terminology and Units.

1970 46pp illustrated 0 408 89350 8 £1.00 or \$3.00

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## LIST OF ABBREVIATIONS

ACHEMA	Ausstellungstagung für Chemisches Apparatewesen
ACS	American Chemical Society
AOAC	Association of Official Analytical Chemists
BIPM	Bureau International des Poids et Mesures
CACC	IUPAC Commission on Automation in Clinical Chemistry
CAS	Chemical Abstracts Service
CBN	IUPAC-IUB Commission on Biochemical Nomenclature
CEE	Communauté Européenne Economique
CID	Comité International des Dérivés Tensio-Actifs
CODATA	ICSU Committee on Data for Science and Technology
COWAR	ICSU Scientific Committee on Water Research
CQUCC	IUPAC Commission on Quantities and Units in Clinical Chemistry
DECHEMA	Deutsche Gesellschaft für Chemisches Apparatewesen
EPQU	IFCC Expert Panel on Quantities and Units
EUCEPA	Comité Européen de Liaison pour la Cellulose et le Papier
FAO	UN Food and Agriculture Organization
FATIPEC	Fédération d'Associations de Techniciens des Industries des Peintures, Vernis, Emaux et Encres d'Imprimerie de l'Europe Continentale
FSPT	US Federation of Societies for Paint Technology
IAEA	International Atomic Energy Agency
IAPT	International Association of Plant Taxonomy
IARC	WHO International Agency for Research on Cancer
IASC	International Association of Seed Crushers
IAWRP	International Association on Water Pollution Research
ICC	International Association for Cereal Chemistry
ICCC	International Conferences on Coordination Chemistry
ICSU	International Council of Scientific Unions
IDF	International Dairy Federation
IFCC	International Federation of Clinical Chemistry
INN	WHO International nonproprietary names for pharmaceutical substances
ISO	International Organization for Standardization
ISO/TC	ISO Technical Committee
ISO/TCSC	ISO/TC Sub-Committee
IUB	International Union of Biochemistry
IUFoST	International Union of Food Science and Technology
IUPAB	International Union of Pure and Applied Biophysics
IUPAP	International Union of Pure and Applied Physics
NBS	US National Bureau of Standards
NIH	US National Institutes of Health
NPL	UK National Physical Laboratory
OCS	IUPAC Section on Organic Coatings
OECD	Organization for Economic Cooperation and Development
PAG	Protein Advisory Group of FAO/WHO/UNICEF
RILEM	Réunion Internationale des Laboratoires d'Essais et de Recherches sur les Matériaux et les Constructions
SCI	UK Society of Chemical Industry
SCOPE	ICSU Scientific Committee on Problems of the Environment
SCP	Single cell protein
SIJ	Système Internationale
SLF	Federation of Scandinavian Paint and Varnish Technicians
UN	United Nations
UNESCO	UN Educational, Scientific and Cultural Organization
UNICEF	UN Children's Fund
WHO	UN World Health Organization



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**INTERNATIONAL UNION OF PURE  
AND APPLIED CHEMISTRY**

**UNION INTERNATIONALE DE CHIMIE  
PURE ET APPLIQUÉE**

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NUMBER 45**

**MAY 1973**

**IUPAC SECRETARIAT**

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Cowley Centre, Oxford OX4 3YF, UK

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Telegrams—IUPAC OXFORD

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International Union of Pure and Applied Chemistry  
1973

# INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

President	— Prof. J. BÉNARD (France)
Vice-President	— Prof. Sir HAROLD THOMPSON (UK)
Secretary General	— Dr. W. GALLAY (Canada)
Treasurer	— Prof. O. HORN (Germany)

## IUPAC INFORMATION BULLETIN

The Bulletin provides a news medium for the various activities of IUPAC, especially of its 40 or so committees which deal with chemical topics needing regulation, standardization or codification. It includes details of forthcoming international symposia which are to be sponsored by IUPAC together with reports of such meetings which have already taken place.

Two series of Appendices to the Bulletin are issued:

- (i) Appendices on Tentative Nomenclature, Symbols, Units, and Standards
- (ii) Technical Reports

In 1973 there will be three issues of the Bulletin (Nos. 45-47). The annual subscription, inclusive of postage, will be US \$9.00 or £3.00 (surface), US \$12.00 or £4.00 (by air). Subscribers are also sent the two series of Appendices automatically and free-of-charge.

Subscription orders may be placed direct, or through an agent, with the IUPAC Secretariat.

### IUPAC SECRETARIAT: NEW TELEPHONE NUMBERS

Please note that from mid-March 1973, the telephone numbers of the IUPAC Secretariat have been changed to:

OXFORD 770125 and 772834



# XXVII IUPAC Conference

MUNICH, 21-31 AUGUST 1973

*Key to Map Overleaf*

- A — Holiday Inn, Leopoldstrasse
- B — Holiday Inn, Olympic
- C — Commerzbank
- D — Air Terminal
- — Underground (Metro)

# CITY OF MUNICH



# **XXVII IUPAC CONFERENCE\***

**MUNICH, 21-31 AUGUST 1973**

## **Accommodation and Travel**

Except for those persons who are making their own arrangements, all reservations for travel and/or accommodation placed through the IUPAC Secretariat have been confirmed in writing to participants. Any queries should be referred to the Secretariat. There will be an IUPAC information desk at Munich airport, operated by Lufthansa, where advice can be obtained on how to reach the Holiday Inns (see also map on opposite page).

There are adequate car parking facilities available at the Holiday Inns.

## **Visas**

Conference participants are recommended to check at the German Federal Republic embassy in their respective countries on the necessity of obtaining a visa to travel to Munich. An official letter supporting a visa application may be obtained from the IUPAC Secretariat.

## **Schedule of Meetings**

Only a few changes have been necessary to the Schedule of Meetings published in *Information Bulletin* No. 44 (December 1972). Meetings will be held either at Holiday Inn Leopoldstrasse (Leopoldstrasse 200, D-8000 Munich 23) or at Holiday Inn Olympic (Schleissheimer Strasse 188-192, D-8000 Munich 40). The two sites are within walking distance of one another. As far as possible, participants have been accommodated in the Hotel at which their meetings will take place. Details of provisional meeting rooms (letters in parentheses—see also page 11) and times of meetings are included in the Schedule given on pages 3-10.

## **Open Meeting on IUPAC Activities**

Company Associates have been invited to send representatives to a meeting on 25 August to discuss the effectiveness and pertinence of IUPAC technical programmes to the total needs of society including industry. The meeting will be chaired by President BÉNARD and open to all Conference participants.

## **Secretariat**

There will be a Conference registration desk at Holiday Inn Leopoldstrasse. Throughout the Conference the IUPAC Secretariat will be located at the Conference Room 'Theresa' of the Holiday Inn in Leopoldstrasse:

Telephone—0811 340971

Telex—05 215439

The Secretariat will be open daily from 0800 until 1830 hours and provide typing, photocopying, and other services to assist Conference participants in their work.

## **Reimbursement**

For those Members of IUPAC bodies eligible for travel and subsistence

\*Attendance restricted to elected Members of IUPAC bodies, National Representatives, and Delegates of Associated Organizations.



expenses and who have requested reimbursement at Munich, this will be made at

Commerzbank  
Leopoldstrasse 109  
D-8000 Munich 40

Further details will be announced later. Preliminary arrangements for reimbursement at Dresdner Bank have now been cancelled.

### **Social Programme**

A Banquet has been arranged for 26 August in the Ballroom 'Konig Ludwig' of the Holiday Inn in Leopoldstrasse. The cost will be DM35 per person (exclusive of wines). Those persons who have indicated a wish to attend may purchase their tickets from the IUPAC Secretariat in Munich. There are still a few places unreserved. Details of receptions for Conference participants will be available on arrival in Munich.

For those persons who have expressed interest in the Opera, performances have been arranged at the Staatstheater am Gärtnerplatz as follows

24 August — 'The Barber of Seville'

25 August — 'The Magic Flute'

Details of the seats available have been circulated with a booking form. If other participants wish to reserve seats, they should write to the IUPAC Secretariat.

A Ladies Programme has been drawn up in conjunction with Amtliches Bayerisches Reisebüro (ABR). Visits are planned for almost every day of the Conference. Full details have been sent to each lady attending Conference. The questionnaire should be returned to ABR by *1 June*. Based on the visits required, a book of tickets may be collected on payment to the ABR desk in the Secretariat at Munich. Tickets for the opera may also be collected on payment to ABR in Munich.

### **Weather and Clothing**

The average temperature during August in Munich is 17 °C. Formal dress will not be required for any of the social functions.

### **XXIV IUPAC Congress**

The Congress will take place at Hamburg from 2 to 7 September, *i.e.*, immediately after the Conference in Munich. The latest programme details are given elsewhere in this Bulletin (see pages 74-79). The joint IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies will also be held in Hamburg during the period 29-31 August (see pages 73-74).

# SCHEDULE OF MEETINGS FOR XXVII IUPAC CONFERENCE

(\*Denotes Joint Meeting)

Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
Council									10-12(H) 14-18(H)		10-12.30(H)
Bureau								9-12(F) 14-18(F)			14-15(F)
Executive Committee							9-12(G) 14-18(G)				15-16(F)
Division Presidents										9-12(F)	
Committee on Publications				9-12(v) 14-18(v)							
Commission on Statutes and Bylaws										14-18(E)	
Committee on Teaching of Chemistry (Officers only)					9-12*(EE) 14-18*(P)						
Coordinating Committee for Analytical Methods			16-18*(F)		16-18*(F)						
Finance Committee						9-12(G) 14-18(G)					
Interdivisional Committee on Machine Documentation				9-12(v) 14-18(v)		9-12(P) 14-18(P)					
Interdivisional Committee on Nomenclature and Symbols	9-12(c)					9-12(u)					
CODATA Open Meeting							19-22(c)				
Open Meeting on IUPAC Activities					20-22(F)				14-18(B)		
Coordinating Committee and Section VI.1			16-18*(F)								

Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
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Clinical Chemistry Section

Section Committee							9-12(Y) 14-18(Y)				
Commission on Automation		9-12(DD) 14-18(DD)	9-12(DD) 14-18*(M)								
Commission on Quantities and Units				9-12(DD) 14-18(DD)	14-18*(W)	9-12(DD) 14-18(DD)		9-12(DD) 14-18(DD)			
Commission on Teaching				9-12(EE) 14-18(EE)	9-12*(EE)	9-12(EE) 14-18(EE)					

Clinical Chemistry Section (Officers) and Clinical Chemistry Commissions (Chairmen)  
14-18(Y)

Commission on Automation and Commission V.3			14-18*(M)								
Commission on Quantities and Units and Commission I.1					14-18*(W)						

Commission on Teaching in Clinical Chemistry and Committee on Teaching of Chemistry (Officers)					9-12*(EE)						
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Physical Chemistry Division

Division Committee	14-18(W)						14-18*(W)	9-12(W) 14-18(W)			
Commission I.1: Physicochemical Symbols, Terminology, and Units		9-12(W) 14-18*(W)	9-12*(W) 14-18*(W)	9-12*(W) 14-18*(W)	9-12(W) 14-18*(W)	9-12*(W)					
Commission I.2: Thermodynamics and Thermochemistry		9-12(X) 14-18*(W)	9-12(X)	9-12*(X) 14-18(Y)	9-12*(X) 14-18*(X)	9-12(X)					



Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
<b>Physical Chemistry Division (continued)</b>											
Sub-Commission I.2.1: Plasma Chemistry				9-12(T) 14-18(T)	9-12*(X) 14-18(DD)	14-18(X)					
Sub-Commission I.2.2: Thermodynamic Tables					9-12(DD) 14-18*(X)						
Commission I.3: Electrochemistry		9-12(CC) 14-18*(B)	9-12*(W) 14-18(CC)	9-12(GC) 14-18*(X)							
Commission I.4: Physicochemical Measurements and Standards		9-12(Y)		9-12*(X)	9-12(BB)						
Sub-Commission I.4.1: Calibration and Test Mats.			9-12(BB) 14-18(BB)	14-18(BB)							
Commission I.5: Molecular Structure and Spectroscopy			9-12(Y) 14-18*(W)	9-12(Y) 14-18*(Y)	9-12(Y) 14-18(Y)	9-12(Y)					
Commission I.6: Colloid and Surface Chem.			9-12(Z) 14-18*(G)	9-12(Z) 14-18*(X)	9-12(Z) 14-18(Z)	9-12*(W)					
Division Committee and Commissions (Officers)	9-12(W)					14-18*(W)					
Commission I.1 and Commission on Quantities and Units in Clinical Chem.					14-18*(W)						
Commissions I.1 and I.2		14-18*(W)									
Commissions I.1 and I.3			9-12*(W)								
Commissions I.1 and I.5			14-18*(W)								
Commissions I.1, I.5 and III.3				14-18*(W)							
Commissions I.1 and I.6						9-12*(W)					
Commissions I.1 and V.5				9-12*(W)							

Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
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**Physical Chemistry Division (continued)**

Commission I.2 and Sub-Commission I.2.1					9-12*(x)						
Commission I.2 and Sub-Commission I.2.2					14-18*(x)						
Commissions I.2 and I.4				9-12*(x)							
Commissions I.3 and I.6				14-18*(x)							
Commissions I.3 and V.5		14-18*(b)									
Commissions I.6 and II.2			14-18*(c)								

**Inorganic Chemistry Division**

Division Committee		9-12*(e)					9-12*(e) 14-18(e)				
Commission II.1: Atomic Weights		14-18(p)	14-18(p)	9-12(p)	9-12(p) 14-18*(p)						
Commission II.2: Nomenclature of Inorganic Chemistry	9-12(e) 14-18(e)	14-18(e)	9-12(g) 14-18*(g)	9-12*(e) 14-18*(e)	9-12(e) 14-18(e)	9-12(e) 14-18(e)					
Commission II.3: High Temperatures and Refractory Materials			9-12(i) 14-18(i)	9-12(i) 14-18(i)	9-12(i) 14-18(i)						
Division Committee and Commissions (Officers)		9-12*(e)					9-12*(e)				
Commission II.1 and Committee on Teaching of Chemistry (Officers)						14-18*(p)					
Commissions II.2 and I.6			14-18*(g)								
Commissions II.2 and III.1 (Officers)				9-12*(e) 14-18*(e)							

Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
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## Organic Chemistry Division

Division Committee					9-12(c) 14-18*(c)	9-12(d) 14-18(d)					
Commission III.1: Nomenclature of Organic Chemistry (Officers only)				9-12*(e) 14-18*(e)							
Commission III.2: Chemical Taxonomy						9-12(p) 14-18(d)					
Commission III.3: Organic Photochemistry			9-12(i) 14-18(i)	9-12(j) 14-18*(w)	9-12(i)	9-12(j)					
Section III.4: Medicinal Chemistry			9-12(aa) 14-18(aa)	9-12(aa) 14-18(aa)	9-12(aa)	14-18(y)					
Division Committee and Commissions/Section (Officers)					14-18*(c)						
Commissions III.1 (Officers) and II.2				9-12*(e) 14-18*(e)							
Commissions III.3, I.1 and I.5				14-18*(w)							

## Macromolecular Division

Division Committee	14-18(d)	9-12(d) 14-18(d)	9-12(d) 14-18(d)		9-12*(g)						
Commission IV.1: Macromolecular Nomen- clature					9-12(v) 14-18(v)	14-18(v)	9-12(v) 14-16(v)	9-12(v) 14-16(v)	9-12(v) 14-16(v)		
Division Committee and Section VI.6 (Officers)					9-12*(g)						



## Analytical Chemistry Division

Division Committee	9-12(Q) 14-18(Q)			9-12*(A) 14-18*(C)	9-12(Q) 14-18(Q)
Commission V.1: Analytical Reactions and Reagents	9-12*(F) 14-18(N)	9-12(N) 14-18(N)	9-12(N) 14-18(N)	9-12(N)	
Commission V.2: Microchemical Techniques and Trace Analysis		14-18(U)	9-12(K) 14-18*(H)	9-12(U) 14-18(U)	
Commission V.3: Analytical Nomenclature	14-18(M)	9-12(M) 14-18*(M)	9-12*(H) 14-18*(M)	9-12(M) 14-18(M)	
Commission V.4: Spectrochemical and Other Optical Procedures for Analysis	9-12(K) 14-18(K)	9-12(K) 14-18(K)	9-12*(H) 14-18*(H)	9-12(K) 14-18(K)	
Commission V.5: Electroanalytical Chemistry	9-12(C) 14-18*(B)	9-12(C) 14-18(C)	9-12*(W) 14-18*(G)	9-12(Q) 14-18(Q)	
Commission V.6: Equilibrium Data	9-12*(T) 14-18(T)	9-12(T) 14-18(T)	9-12*(S) 14-18*(G)	9-12(S) 14-18(S)	
Commission V.7: Analytical Radiochemistry and Nuclear Materials		9-12(P)	14-18(P)	9-12(T)	9-12(T) 14-18*(T)
Division Committee (Secretary and Commissions (Secretaries))	9-12(B) 14-18(B)				
Division Committee and Commissions (Chairmen)				14-18*(C)	
Division Open Meeting				9-12*(A)	
Commission V.1 and Section VI.1	9-12*(F)				

Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
<b>Analytical Chemistry Division (continued)</b>											
Commissions V.2 and V.4				14-18*(H)							
Commission V.3 and Commission on Automation in Clinical Chemistry			14-18*(M)								
Commissions V.3 and V.4				9-12*(H)							
Commissions V.5 and I.1				9-12*(W)							
Commissions V.5 and I.3		14-18*(B)									
Commissions V.5 and V.6				14-18*(G)							
Commission V.6 (Solubility data)				9-12*(S)							
Commission V.6 (Information retrieval)		9-12*(T)									
Commission V.7 and Committee on Teaching of Chemistry (Officers)							14-18*(T)				

<b>Applied Chemistry Division</b>											
Division Committee	9-12*(A) 14-18(A)					14-18*(A)	9-12(A) 14-18(A)				
Section VI.1: Food		9-12*(F) 14-17*(F) 19-22*(F)	10-11(F)	10-12(F) 14-18*(F)	14-16(F)	9-12(F)					
Commission VI.1.1: Food Additives			11-12(F) 14-16(F)	9-10(F)	9-12(F)						
Commission VI.1.2: Food Contaminants			11-12(B) 14-16(E)	9-10(C)	9-12(D)						
Section VI.2: Fermentation Industries		9-12(F) 14-17*(F)	9-12(S) 14-18(S)	9-12*(G) 14-18(A)	9-12(S)						

Meeting of	Tuesday 21 August	Wednesday 22 August	Thursday 23 August	Friday 24 August	Saturday 25 August	Sunday 26 August	Monday 27 August	Tuesday 28 August	Wednesday 29 August	Thursday 30 August	Friday 31 August
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### Applied Chemistry Division (continued)

Section VI.3: Oils and Fats		9-12(A) 14-17*(A)	9-12(A) 14-18(A)	9-12(A) 14-18*(F)	9-12(A) 14-18(A)						
Section VI.4: Air Quality		9-12(R) 14-18(R)		9-12(R) 14-18(R)	9-12(R)	9-12(R)					
Section VI.5: Pesticides		9-12(B) 14-17*(A) 19-22*(F)	9-12(B)				9-12(B)				
Commission VI.5.1: Terminal Pesticide Residues			14-18(B)	9-12(B) 14-18(B)							
Commission VI.5.2: Pesticide Residue Analysis					9-12(B) 14-18(B)	9-12(B)					
Section VI.6: Organic Coatings			14-18(Q)	9-12(Q) 14-18(Q)	9-12*(G) 14-18(T)	9-12(T)					
Section VI.7: Water Quality			9-12(L) 14-18(L)	9-12*(G) 14-18(I)	9-12(L) 14-18(L)						
Division Committee and Sections (Officers)	9-12*(A)										
Division Open Meeting						14-18*(A)					
Section VI.1 and Commission V.1		9-12*(F)									
Sections VI.1 and VI.2		14-17*(F)									
Sections VI.1 and VI.3				14-18*(F)							
Sections VI.1 and VI.5		19-22*(F)									
Sections VI.2 and VI.7				9-12*(G)							
Sections VI.3 and VI.5		14-17*(A)									
Section VI.6 (Officers) and Macromolecular Division Committee					9-12*(G)						



## Meeting Rooms at Holiday Inn Leopoldstrasse

A—Conference Room 'Gabriele'  
 B—Conference Room 'Elisabeth'  
 C—Room 123  
 D—Room B3  
 E—Room C3  
 F—Conference Room 'Luitpold A'  
 G—Conference Room 'Luitpold B'  
 H—Ballroom 'Konig Ludwig'

I—Suite 615/616  
 J—Suite 619/620  
 K—Suite 621/622  
 L—Suite 515/516  
 M—Suite 519/520  
 N—Suite 521/522  
 O—Room 116

P—Room 117  
 Q—Room 118  
 R—Room 124  
 S—Room 125  
 T—Room 126  
 U—Room 127  
 V—Room 128

## Meeting Rooms at Holiday Inn Olympic

W—Conference Room 'Maximilian A'  
 X—Conference Room 'Maximilian B'  
 Y—Presidential Suite

Z—Suite 127  
 AA—Suite 227  
 BB—Suite 327

CC—Suite 426  
 DD—Room 412  
 EE—Room 413

# **AGENDA FOR XXVII COUNCIL MEETING**

**Munich, 29 and 31 August 1973**

1. Finalization of Agenda
2. Approval of Minutes of XXVI Council Meeting
3. Announcement of Nominations for Officers and Bureau Members
4. Announcement of Time of Elections
5. Statutory Report of President on State of the Union
6. Biennial Report of Treasurer
7. Report of Finance Committee
8. Application for National Adhering Organization Status
9. Applications for Associated Organization Status
10. Tentative Budgets for 1974 and 1975
11. Dues Structure and fixing Annual Dues for 1974 and 1975
12. Reports of Division Presidents and Clinical Chemistry Section
13. Report of Committee on Teaching of Chemistry
14. Report of Committee on Publications
15. Report on International Office for Analytical Chemistry
16. Period of Office of IUPAC Treasurer
17. Adoption of Nomenclature Rules
18. Bureau Proposals for New Bodies
19. Ratification of Decisions taken by Bureau and Executive Committee since XXVI Conference
20. Elections
21. Ratification of Dates and Place of XXVIII Conference and XXV Congress
22. Place of XXIX Conference and XXVI Congress
23. Any Other Business (Discussion only)

# OFFICIAL DELEGATES OF NATIONAL ADHERING ORGANIZATIONS AT XXVII CONFERENCE\*

(as at 7 April 1973)

## **Arab Republic of Egypt (2)**

Prof. A. ABOU-EL-AZM, Academy of Scientific Research and Technology,  
101 Kasr El Eini Street, Cairo (Arab Republic of Egypt)

## **Argentina (4)**

## **Australia (4)**

Dr. S. D. HAMANN, Division of Applied Chemistry, Commonwealth Scientific  
and Industrial Research Organization, POB 4331, Melbourne, Victoria  
(Australia 3001)

Prof. A. ALBERT, Department of Medical Chemistry, John Curtin School of  
Medical Research, Australian National University, POB 4, Canberra,  
ACT (Australia 2600)

Dr. I. BROWN, Division of Applied Chemistry, Commonwealth Scientific  
and Industrial Research Organization, POB 4331, Melbourne, Victoria  
(Australia 3001)

Prof. A. R. H. COLE, School of Chemistry, University of Western Australia,  
Nedlands, Western Australia (Australia 6009)

Bureau Member:

Dr. A. L. G. REES (Past-President of IUPAC), Division of Chemical Physics,  
Commonwealth Scientific and Industrial Research Organization, POB 160,  
Clayton, Victoria (Australia 3168)

## **Austria (2)**

Bureau Member:

Prof. H. MALISSA, Institut für Analytische Chemie und Mikrochemie der  
Technischen Hochschule Wien, Getreidemarkt 9, A-1060 Wien (Austria)

## **Belgium (4)**

Prof. G. DUYCKAERTS, Institut de Chimie et Métallurgie, Université de Liège  
au Sart Tilman, B-4000 Liège (Belgium)

Prof. G. SMETS, Laboratorium voor Macromoleculaire en Organische  
Scheikunde, Universiteit te Leuven, Celestijnenlaan 200 F, B-3030 Hever-  
lee (Belgium) (also Bureau Member)

## **Brazil (2)**

## **Bulgaria (2)**

Prof. I. M. PANAYOTOV, Institute of Organic Chemistry, Bulgarian Academy  
of Sciences, Sofia 13 (Bulgaria)

\*Unless he is also an Official Delegate from a National Adhering Organization, a Bureau Member is not entitled to vote at a meeting of Council. An Observer or Secretary to a Delegation is not entitled to vote.



Prof. A. SHELUDKO, Institute of Physical Chemistry, Bulgarian Academy of Sciences, Sofia (Bulgaria)

### **Canada (6)**

Prof. H. G. THODE, Nuclear Research Building, Department of Chemistry, McMaster University, Hamilton, Ontario L8S 4K1 (Canada) (Leader of Delegation)

Dr. W. GALLAY, 490 Cloverdale Road, Ottawa, Ontario K1M 0Y6 (Canada) (also Bureau Member, Secretary General of IUPAC)

Bureau Members:

Dr. P. R. GENDRON, Pulp and Paper Research Institute of Canada, 570 St. John's Boulevard, Pointe Claire 720, Quebec (Canada)

Dr. D. B. TONKS (Chairman of IUPAC Section on Clinical Chemistry), Division of Clinical Chemistry, Montreal General Hospital, 1650 Cedar Avenue, Montreal 109, Quebec (Canada)

### **Chile (1)**

### **Colombia (2)**

### **Cuba (1)**

### **Czechoslovakia (4)**

Prof. V. HEROUT, Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Flemingovo náměstí 2, Praha 6 - Dejvice (Czechoslovakia) (also Bureau Member)

Prof. J. GAŽO, Chem. techn. Fakulta, Slovenská Vysoká Škola Technická, Jánska 1, Bratislava (Czechoslovakia)

Acad. V. KELLÖ, Chem. techn. Fakulta, Slovenská Vysoká Škola Technická, Jánska 1, Bratislava (Czechoslovakia)

Prof. A. A. VLČEK, Polarografický Ústav J. Heyrovského, Československá Akademie Věd, Vlašská 9, Praha 1 (Czechoslovakia)

### **Denmark (4)**

Mr. P. H. FINK-JENSEN, A/S Sadolin og Holmblad, Holmbladsgade 70, DK-2300 København S (Denmark)

Prof. K. A. JENSEN, Kemisk Laboratorium II, H. C. Ørsted Institutet, Universitetsparken 5, DK-2100 København Ø (Denmark)

Prof. A. KJÆR, Organisk-Kemisk Laboratorium, Danmarks Tekniske Højskole, Bygning 201, DK-2800 Lyngby (Denmark)

Prof. S. VEIBEL, Organisk-Kemisk Laboratorium, Danmarks Tekniske Højskole, Bygning 201, DK-2800 Lyngby (Denmark)

### **Finland (4)**

Dr. J. LARINKARI, Federation of Finnish Chemical Industry, POB 28, SF-00131 Helsinki 13 (Finland)

Prof. H. SUOMALAINEN, Finnish State Alcohol Monopoly (Alko), POB 350, SF-00101 Helsinki 10 (Finland) (also Bureau Member)

## **France (6)**

Prof. G. CHAMPETIER, École Supérieure de Physique et de Chimie Industrielle, Université de Paris, 10 rue Vauquelin, F-75005 Paris (France) (Leader of Delegation)

Prof. H. BENOIT, Centre de Recherches sur les Macromolécules, 6 rue Boussingault, F-67083 Strasbourg (France) (also Bureau Member, President of IUPAC Macromolecular Division)

Mr. J. BROCARD, Direction Centrale du Développement Études et Recherches, Société Ugine Kuhlmann, BP 175, 25 boulevard de l'Amiral Bruix, F-75 Paris 16° (France)

Prof. F. GALLAIS, Centre National de la Recherche Scientifique, 15 quai Anatole, F-75700 Paris 7° (France)

Prof. G. OURISSON, Institut de Chimie, Université Louis Pasteur Strasbourg, BP 296/R 8, 1 rue Blaise Pascal, F-67008 Strasbourg (France) (also Bureau Member, President of IUPAC Organic Chemistry Division)

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### **Japan (6)**

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### **Norway (4)**

### **Poland (4)**

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### **Republic of China (4)**

### **Republic of Korea (2)**



### **Republic of South Africa (4)**

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- Prof. F. J. JOUBERT, National Chemical Research Laboratory, Council for Scientific and Industrial Research, POB 395, Pretoria (Republic of South Africa)
- Dr. W. T. DE KOCK, South African Embassy, Heumarkt 1, D-5000 Köln (Germany)
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- Dr. R. MARCUSE, Svenska Institutet för Konserveringsforskning, Kallebäck, Fack, S-400 21 Göteborg 16 (Sweden)

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- Dr. O. ISLER, F. Hoffmann-La Roche & Co. AG, CH-4002 Basel (Switzerland) (also Bureau Member)
- Dr. W. G. STOLL, CIBA-GEIGY AG, CH-4002 Basel (Switzerland)

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#### **Union of Soviet Socialist Republics (6)**

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Prof. E. CAMPAIGNE, Department of Chemistry, Indiana University, Bloomington, Indiana 47401 (USA)  
Dr. T. B. OWEN, National Science Foundation, Washington, DC 20550 (USA)  
Prof. C. WALLING, University of Utah, Salt Lake City, Utah 84112 (USA)

Secretary to Delegation:

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Dr. G. WADDINGTON (President of IUPAC Physical Chemistry Division), Ocean Villa Apartment 401, 20 Olympia Avenue, Victoria, British Columbia (Canada)

### **Venezuela (1)**

### **Yugoslavia (2)**

**OFFICIAL DELEGATES OF ASSOCIATED  
ORGANIZATIONS AT XXVII CONFERENCE\***

**Federation of European Chemical Societies**

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**International Society of Magnetic Resonance**

Dr. D. FIAT, Weizmann Institute of Science, Rehovot (Israel)

(see page 102 for further Delegates of  
National Adhering Organizations)

\*These Delegates have the status of Observer and they are not entitled to vote.



## REPORTS OF IUPAC BODIES

### COMMISSION ON MACROMOLECULAR NOMENCLATURE (IV.1)

Knokke-Zoute, 4-9 June 1972

*Present:* Dr. K. L. LOENING (Chairman), Dr. L. C. CROSS (Secretary), Prof. P. CORRADINI, Dr. R. B. FOX, Dr. W. RING, Prof. G. SMETS, Prof. T. TSURUTA (Titular Members); Prof. C. LIÉBECQ (Observer from IUPAC-IUB Commission on Biochemical Nomenclature).

#### Previous Meeting

The minutes (*Comptes Rendus XXVI Conference*, pp. 170-171) were taken as read. Individual items were dealt with as they arose during the meeting.

#### List of Symbols for Synthetic Polymers and Polymer Materials

Tentative Nomenclature Appendix No. 12 (February 1971) to the *Information Bulletin* and comments made thereon were considered. The changes agreed would be incorporated into a revised document, which would be submitted for publication as an IUPAC definitive (final) recommendation.

#### Basic Definitions of Terms Relating to Polymers

The definitions in Tentative Nomenclature Appendix No. 13 (February 1971) to the *Information Bulletin* were thoroughly revised in the light of comments received since its issue, various documents by ISO/TC 61 (Plastics), and further consideration by the Commission. The revised definitions would be used to prepare a new version of the document for publication as an IUPAC definitive recommendation.

#### List of Subsidiary Definitions

It was agreed that a supplementary list of subsidiary definitions of polymer terms should be prepared and considered as a major item at the 1973 meeting. Prof. TSURUTA would take responsibility for this project and Members should send him their suggestions. A provisional list (T. Tsuruta, April 1972) was considered and those terms considered worth including were decided.

#### Rules for Nomenclature of Regular Single-strand Organic Polymers

The revised draft by Dr. FOX was reviewed and a number of minor changes made. Dr. FOX agreed to produce an upgraded version, incorporating these changes, which would then be passed for publication as an IUPAC tentative document. [*Editorial Note.* Published as Tentative Nomenclature Appendix No. 29 (November 1972) to the *Information Bulletin*.]

#### Stereochemical Nomenclature of Polymers

The earlier proposals to create, in 1973, tentative rules on stereochemical nomenclature around drafts produced by Prof. CORRADINI were confirmed. The drafts were further considered, together with other relevant IUPAC documents and correspondence (F. A. BOVEY). Prof. CORRADINI accepted

the Commission's request to provide a revised full text for the 1973 meeting and it was hoped that such a text could form the tentative version of rules for publication by IUPAC.

### **Biochemical Nomenclature for Polymers and Macromolecules of Biological Interest**

Prof. LIÉBECQ drew attention to a number of sets of rules, promulgated by the IUPAC-IUB Joint Commission on Biochemical Nomenclature (CBN), that dealt with specialist areas of polymer and macromolecular nomenclature (e.g., nucleic acids). The Commission accepted his offer to supply offprints for study at the 1973 meeting.

### **Documents from ISO/TC 61**

Throughout the meeting, topics covered in ISO/TC 61 documents were considered at the time the same topics arose in the Commission's papers. It was agreed that

- (i) Dr. G. M. KLINE should receive all documents of the Commission as a means of improving communications between the two bodies.
- (ii) Prof. SMETS would deal directly with Dr. KLINE over the French-language version of ISO/TC 61 drafts and particularly with the matters raised in Dr. KLINE's letter of 20 March 1972. Prof. SMETS would seek the advice of French and Belgian colleagues as necessary.

### **Other Documents**

'Representation and Description of Steric Structures and Conformations of Molecules', by M. PERALDO, discussed problems concerned with organic rather than polymer chemistry. It would, therefore, be passed for consideration by the Commission on Nomenclature of Organic Chemistry (III.1).

### **Future Work**

- (i) Extension of Nomenclature of Single-strand Polymers to deal with Ladder Polymers (LOENING-FOX).
- (ii) Nomenclature and Symbolism of Copolymers (FOX). Existing documents issued by CBN and proposals by, for example, Dr. W. E. COHN, to be reviewed as a preliminary step.
- (iii) Classification by Families, including KORSHAK's proposals (RING-SMETS-KORSHAK), to be studied when a Russian could attend the Commission meeting.
- (iv) Nomenclature and Symbolism of Inorganic Polymers (CROSS) to be developed from existing documents of the Commission on Nomenclature of Inorganic Chemistry (II.1).

L. C. CROSS

## **SECTION ON FOOD (VI.1)**

### **Kungälv, Göteborg, 23-25 August 1972**

The report of the Section meeting was published in *Information Bulletin* No. 44 (December 1972, pp. 55-59). The meetings of its two Commissions, the minutes of which appear hereafter, took place in conjunction with that of the Section.

## COMMISSION ON FOOD ADDITIVES (VI.1.1)

*Present:* Dr. E. O. HAENNI (Chairman), Dr. A. E. WASSERMAN (Secretary), Prof. G. GRIMMER (Titular Members); Mr. D. F. DODGEN, Dr. A. EDHBORG, Prof. A. RUTKOWSKI, Mr. E. A. WALKER (Associate Members); Prof. W. BALTES (National Representative); Dr. K. KOJIMA, Dr. E. LÜCK, Dr. D. N. RHODES (Observers from Section on Food).

### Single Cell Proteins

The minutes of the last meeting of the predecessor Commission (*Comptes Rendus XXVI Conference*, p. 209) were reviewed, particularly with respect to the request that the Food Additives Commission consider the method of analysis for polycyclic aromatic hydrocarbons in the proposed Standards of Identity for Single Cell Proteins submitted to the Food Section by the Fermentation Industries Section (VI.2). It was agreed that the recommended benzo(a)pyrene method was satisfactory for the purpose.

### Publications

It was noted that two Technical Report Appendices to the *Information Bulletin* had been published in February 1972 by IUPAC as recommended by the predecessor Trace Substances Commission, namely, 'Recommended Method for Benzo(a)pyrene in Foods' (No. 4) and 'A Survey of Analytical Procedures for Traces of *N*-Nitrosamines in Foods' (No. 5).

### Polycyclic Aromatic Hydrocarbons

A report was submitted on the AOAC-IUPAC collaborative study of the multicomponent method for determining polycyclic aromatic hydrocarbons in food (method by Dr. J. W. HOWARD, *et al.*, US Food and Drug Administration). Smoked ham was fortified with 10 ppb of each of benzo(a)pyrene, benzo(e)pyrene, benz(a)anthracene, and benzo(g,h,i)perylene, and the average recovery was 70-90%. Twelve laboratories participated in the study; the results of two laboratories were eliminated from the statistical evaluation because they failed to follow the prescribed procedure. UV analysis was the primary technique for determination. Although there was a significant difference between laboratories in the analytical values for benzo(a)pyrene and benzo(e)pyrene (but not for the other compounds), overall standard deviations between and within laboratories ranged only from 7.4 to 12.7%. The authors recommended adoption of the multicomponent method as an official AOAC procedure.

Dr. GRIMMER submitted some comments on the procedure. He felt that the use of only four hydrocarbons was an insufficient test for a 'multicomponent' procedure. He pointed out that it would be difficult to separate benzo(a)pyrene, phenanthrene, chrysene, fluoranthene, pyrene, benzo(a)-anthracene, triphenylene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(e)pyrene, dibenzo(a,h)anthracene, anthanthrene, benzo(g,h,i)perylene, *etc.*, by TLC and suggested the use of GLC for this separation. However, the design of the then ongoing collaborative study was reported at the 1971 meeting of the Trace Substances Commission (Sub-Commission on Smoke Constituents) as a practical test of the adequacy of the proposed procedure. This judgment was based not only on demonstration in Dr. HOWARD's laboratory of the method's capability of determining the known carcinogenic polycyclic aromatic hydrocarbons, but also on its application by FDA and



US Department of Agriculture laboratories to the analysis of a wide variety of foods, including numerous smoked foods. The Sub-Commission had recommended completion of the study and the report had been accepted for publication in the journal of AOAC.

Mr. WALKER proposed that the *procedure* be submitted to the Food Section with the recommendation that it be accepted and published as a Recommended Method, noting, however, Dr. GRIMMER's comments.

Dr. RHODES suggested that the title of the report be changed to read 'Collaborative Study of the Howard Multicomponent Method for Polycyclic Aromatic Hydrocarbons in Foods', to identify the method studied.

Dr. HAENNI called attention to the erroneous attribution in the record of the Food Section of the subject of the study to the Commission on Food Contaminants. He noted that this error should be corrected and particularly so in publication of the Technical Report.

### Nitrosamines

Mr. WALKER reported on the results of the initial collaborative nitrosamine study mounted by the International Agency for Research on Cancer (IARC). Solutions of nitrosodiethylamine (DENA) and *N*-nitrosopyrrolidine (NOPyr) in water and in  $\text{CH}_2\text{Cl}_2$  were submitted to nineteen laboratories for analysis by their normal procedure. Results were within  $\pm 10\%$  of the expected values regardless of the type of detector used in the gas chromatographic procedure adopted by almost all participants.

The next stage would be to send samples of salami spiked with *N*-nitrosodimethylamine, DENA, and NOPyr to evaluate extraction and cleanup procedures. There was discussion of the method of preparing the sample: spiking a solid piece of salami (as proposed by IARC) *vs.* grinding it first. This question was referred back to Mr. WALKER for resolution with the IARC committee.

Because IARC was actively engaged in carrying out the collaborative study, the Commission recommended participation through its Members acting as collaborators and through ultimate evaluation of the final results.

### Nitrites and Nitrates

Dr. WASSERMAN submitted a report on analytical procedures for nitrite and nitrate in foods. This was a survey of methodology in the literature. At least three procedures had been studied collaboratively: (1) the AOAC method in which nitrate was detected by reaction with xylenol and nitrite by the Greiss-Ilosvay reaction with sulfanilic acid and  $\alpha$ -naphthylamine; (2) the Kamm method in which nitrate was reduced with cadmium to nitrite, then determined with an excess of  $\alpha$ -naphthylamine (both to diazotize and couple); (3) the proposed CEE method in which nitrate was also reduced with cadmium, but measured by reaction with sulfanilamide and 1-naphthylethylene diamine.

It was recommended that a collaborative study be established to evaluate the relative merits of the AOAC and proposed CEE methods for analyzing for nitrite and nitrate. Dr. RHODES would investigate the possibility of the British Meat Research Institute conducting this study and advise the Chairman accordingly.

Mr. WALKER noted that  $\alpha$ -naphthylamine should not be used in a recommended procedure because many laboratories might not allow its use. Dr. WASSERMAN further reported on a critical review of the AOAC procedure carried out in his laboratory and discussed some of the findings.

## **Amines and Amides**

A report on analytical procedures for determining amines and amides, prepared by Drs. MOHLER and MAYRHOFER, had been submitted by Prof. BELITZ. This was a survey of the literature. It was recommended that the state of the analytical art was such that the Food Additives Commission could not logically undertake anything in this area at the present time. It was recognized that work was being conducted in several laboratories and the Commission would await further developments.

## **Future Activity**

(i) No report on analysis for polyphosphate in meat was submitted. However, it was brought out that there was really no analytical problem with the polyphosphates. It was agreed to remove this subject from the Commission's activities.

(ii) Prof. RUTKOWSKI was unable to submit a report on analysis for antioxidants because of his new work assignments and responsibilities. He stated that antioxidants were not a legal problem in Poland. Discussion developed that multiantioxidant methodology was a need in USA, UK, and Sweden (and soon Germany), where use of antioxidants was permitted. Dr. HAENNI stated that there would be a report to AOAC in October on antioxidant analysis and suggested awaiting this report before further action was taken.

(iii) Prof. BALTES submitted a report on the determination of urethane in beverages to which diethylpyrocarbonate had been added. Only one method, including applicability to wine, was available—the Pauli procedure—which would be published shortly. Dr. BALTES discussed the problem of the reactions of diethylpyrocarbonate with various food components and gave details of the Pauli procedure. The method had been submitted to FAO-WHO and to the German Fremdstoff Commission. The Commission on Food Additives agreed to take note of this procedure, but because it would be the only analytical procedure published to date, would await further developments. The Commission also felt that this method could not be used generally at this time because not all laboratories had the required mass spectrometer.

(iv) Dr. HAENNI raised the question of drug residues in edible products from animals on medicated feeds. A discussion arose as to whether this subject belonged in the Food Additives or Food Contaminants Commissions. It was agreed to submit the matter to the Food Section for resolution.

(v) As a matter of new business from the Food Section, the Commission discussed the question of methods for polycyclic aromatic hydrocarbons in food colours to assure compliance with relevant CEE specifications for such colours. Dr. HAENNI suggested deferment of action until he could discuss the problem with specialists in the Color Certification Laboratory of the US Food and Drug Administration. For this purpose he would require details of the subject specifications which were not available at the meeting.

A. E. WASSERMAN

## COMMISSION ON FOOD CONTAMINANTS (VI.1.2)

*Present:* Dr. R. MARCUSE (Chairman), Dr. H. GUTHENBERG (Secretary), Dr. N. R. JONES, Dr. P. KROGH, Dr. K. OHNO, Dr. B. L. OSER, Dr. I. F. H. PURCHASE (Titular Members); Dr. A. D. CAMPBELL (Associate Member); Prof. L. ACKER (National Representative); Dr. H. FISCHBACH, Dr. K. KOJIMA, Dr. P. L. SCHULLER (Observers from Section on Food).

### Determination of Trace Metals

*Mercury.* Dr. GUTHENBERG had elaborated a method for the determination of total mercury in fish which had been distributed to the Members for comment. They were invited to take part in a collaborative investigation of this method. A procedure based on the same principles, *i.e.*, a combination of IUPAC wet digestion and Lindstedt's atomic absorption spectroscopy method, had been used for 2-3 years by Dr. SCHULLER.

In the meantime it had been established that iodine present in sea fish might interfere in the determination of mercury. Work was in progress in Stockholm to study the practical significance of these findings. As soon as the analytical difficulties had been overcome a collaborative test would be initiated, based on the methodology as practised by Dr. SCHULLER. Freeze-dried fish of known mercury content had been received from Canada to be used as samples and a number of laboratories had announced their interest to take part in a collaborative test.

Dr. KOJIMA pointed out that it was essential to distinguish between determining mercury in fish and in food additives. Dr. MARCUSE proposed and Members agreed that a list of additives should be made available for which CEE methods of analysis, including the determination of mercury, were required.

*Lead.* Dr. KOJIMA and Dr. OHNO had prepared an addendum to the existing IUPAC method which had been distributed to Members for comment. Dr. GUTHENBERG, supported by Dr. SCHULLER, pointed out that during wet digestion of organic material, especially vegetables, a precipitate with occlusion of lead might be formed. Dr. OHNO had prepared an additional addendum to be distributed to Members for comment. It appeared that it would be possible to publish a report without any collaborative study.

*Cadmium.* Dr. A. J. COLLINGS (Section on Food) had prepared a report on the determination of cadmium in food which he was going to update, taking into account comments received. The report was planned to be published, without further distribution to Members, in the IUPAC Technical Reports series.

*Copper.* A report on the determination of copper in food was being prepared and would be distributed by Dr. MARCUSE. Dr. KOJIMA promised his collaboration.

### Determination of Selenium

The report prepared by Dr. J. SANDLER (Section on Food) had been distributed to Members. Some comments had been received and forwarded to him.

### Determination of Fluorine

A report elaborated by Prof. R. TRUHAUT (Section on Food) could be expected soon and would be distributed to Members.



## Determination of Mycotoxins

Dr. PURCHASE reported that a collaborative study on the stability of aflatoxin M<sub>1</sub> standards had been completed. The report describing the study and its results should be published without delay.\* The second phase of the collaborative study of methods for determining aflatoxin M in milk should be completed in the near future.

Attempts had been made to obtain support from IUPAC for the International Aflatoxin Check Sample Series (IACSS). There was a widespread international interest in a continuing series of check samples available to any laboratory. It was recommended that official support should be obtained for a continuing IACSS.

A collaborative study of a method for the determination of ochratoxin A, which would be recommended as an AOAC official first action method, would soon be published by NESHEIM. The Commission should accept the procedure as an IUPAC method before the next Food Section meeting because of the evidence that residues occurred in food of animal origin.

Progress had been made in citrinin methodology and a collaborative study should be carried out soon.

To the rapid field method for determination of aflatoxin developed by CUCULLU and PONS, five modifications had come out. No further action was contemplated at the moment.

The aflatoxin methods for cocoa and copra which were recommended by IUPAC at the 1971 meeting, were being edited for publication by the Union in the Technical Report series (see page 100).

A review of cleanup procedures for the analysis of aflatoxins had been completed.

Dr. PURCHASE considered important mycotoxins to be: ochratoxin (in corn), citrinin (in peanut, barley), sterigmatocystin (in coffee, wheat), serotonin (in corn wheat), patulin (in apple juice, other apple products), aflatoxin (in corn). Methodology for rapid screening was needed. A report would be prepared before the next meeting.

Two further problems were important: sampling and the skin test, which should be deleted and substituted by a chemical test.

## Symposium on Control of Mycotoxins

A successful symposium was held on 21-22 August 1972 at Kungälv, organized by the Commission under the Chairmanship of Dr. MARCUSE with the assistance of the Swedish Institute for Food Preservation Research at Göteborg. It was sponsored by IUPAC and the Swedish National Committee for Chemistry and supported by the Swedish Board for Technical Development and the Danish Natural Science Research Council. Eighty participants from 20 countries attended and 29 papers were presented. Plenary lectures were given by Dr. L. A. GOLDBLATT (USA) and Dr. W. H. BUTLER (UK). The programme included a roundtable discussion chaired by Prof. F. BERGLUND (Sweden) on *Natural Occurrence of Mycotoxins and Control Measures by Supervising Authorities*. The Commission agreed to publish most of the papers read at the Symposium in the IUPAC journal, *Pure and Applied Chemistry*. Dr. KROGH would act as the Symposium Editor.

\*Published as Technical Report No. 6 (November 1972), an appendix to the *Information Bulletin*.

## **Single Cell Proteins**

With reference to requests from PAG and the Fermentation Industries Section (VI.2), Dr. JONES had prepared reports concerning estimation of available lysine and measurement of RNA in SCP products.

The Commission recommended to the Food Section to confirm to PAG the adequacy of the Carpenter method for the estimation of available lysine [K. J. CARPENTER, *Biochem. J.* **77**, 604 (1960) and other references in Dr. JONES' IUPAC review]. PAG should also be requested to note the utility of the procedure of A. G. ROACH, P. SANDERMAN and D. R. WILLIAMS [*J. Sci. Food Agric.* **18**, 274 (1967)] for SCP products when information on total lysine would also be of value as in the case, for instance, with heat processed products. These conclusions should be transmitted also to the Fermentation Industries Section.

It was also concluded that, taking into consideration the deliberations of the Symposium on the Chemistry, Biology, and Physics of Protein Evaluation (Reading, March 1972), it was unnecessary to pursue a collaborative analytical study on available lysine estimation. It was not proposed to pursue such a project until such time as specifications were advanced by PAG.

The Commission noted some progress in the consideration of RNA and purine analysis in SCP products. This work was, however, only in a preliminary phase and was continuing.

With respect to the future programme Dr. JONES hoped to receive comments on the SCP specifications for transmission to the Fermentation Industries Section. He would continue his considerations of RNA/purine analysis, examine the situation concerning analysis of 'true' protein, and study quality assessments involved in SCP work. Dr. OSER would consider analysis of sulfur amino acids.

## **Purity Requirements for Dispersion Solvents**

Draft specifications for some seven dispersion solvents used in food had been sent to Members who were asked to submit comments from industry. Some comments had been received.

The Commission felt that further comments were desirable, especially from international organizations such as FEMA and IOFI. Members were asked to contact interested industries for additional comments.

## **IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies**

Dr. MARCUSE gave a short review of the preparations and especially those items which were in the work area of the Commission (see also pp. 73-74).

## **Future Activity**

The future work of the Commission consisted mainly of items mentioned above which needed to be pursued further.

Dr. OSER pointed out that from legal points of view it was important to distinguish between food additives and food contaminants. Problems might arise if certain projects were to be treated by the Food Additives Commission or the Food Contaminants Commission, e.g., polycyclic hydrocarbons which were aroma substances as well as contaminants. It could also be questioned whether it was adequate to have the SCP project in the Food Contaminants Commission programme. A better designation of the Food Contaminants Commission might be Food Quality Commission according to Dr. OSER.

Dr. OSER, supported by Dr. CAMPBELL, considered methods of analysis for cadmium and tin to be important subjects for a long term programme. Furthermore, it would be desirable to elaborate methods for the detection of various added proteins above a certain limit in foods.

### **Other Business**

Dr. MARCUSE referred to a letter received from Prof. J. F. REITH (Section on Food), dealing with an investigation of methods for the testing of purity of antioxidants to be carried out by Prof. BELITZ, Dr. KOJIMA, and Prof. REITH. Because such a project had not been mentioned in the minutes of the 1971 meeting in Washington, he asked for comments. It was regretted that neither Prof. REITH nor Prof. BELITZ was present. Dr. KOJIMA explained that such a project had been discussed with Prof. BELITZ and Prof. REITH in Washington. Members discussed the need for such an investigation. It was agreed to ask Prof. REITH for further information.

R. MARCUSE

## **COMMISSION ON NOMENCLATURE OF ORGANIC CHEMISTRY (III.I)**

**Villefranche-sur-Mer, 4-10 September 1972**

*Present:* Prof. N. LOZAC'H (Chairman), Mr. S. P. KLESNEY (Secretary), Dr. L. C. CROSS, Dr. K. L. LOENING, Prof. J. RIGAUDY, Prof. S. VEIBEL (Titular Members); Dr. H. GRÜNEWALD, Dr. K. HIRAYAMA, Prof. F. VÖGTLE (Associate Members); Prof. J. CHATT (Observer from Commission on Nomenclature of Inorganic Chemistry).

### **Organoelement Compounds**

After consideration of some general issues involved in publication of the tentative version of Section D of *Nomenclature of Organic Chemistry* (the Blue Book), a detailed review was made of the various subsections:

#### **Preamble**

#### **D-0 Nomenclature Systems**

#### **D-1 Coordination Compounds**

#### **D-2 Organometallic Compounds**

#### **D-3 Chains and Rings with Regular Patterns of Heteroatoms**

#### **D-4 Organic Compounds containing Phosphorus, Arsenic, Antimony or Bismuth**

#### **D-5 Organosilicon Compounds**

#### **D-6 Organoboron Compounds**

Prof. LOZAC'H would finalize the manuscripts for D-0, 1, 2, 3, and 4, and Dr. Cross for D-5 and 6. Publication was anticipated by mid-1973.

### **Carbohydrates**

The tentative version of 'Carbohydrate Nomenclature-I' had been published as Tentative Nomenclature Appendix No. 7 (September 1970) to the *Information Bulletin*. It was noted that advancement to definitive (final) publication would not take place until the two relevant Commissions (CNOC and CBN) had had an opportunity to review all criticisms received.



## Cyclitols

The tentative version of 'Rules for Cyclitol Nomenclature' had appeared in *Information Bulletin* No. 32 (August 1968, pp. 51-80). Prof. LOZAC'H would write to Prof. O. HOFFMANN-OSTENHOF (Chairman of CBN) to determine the procedure for advancing these Rules to definitive status. Meanwhile, any comments or changes should be sent to Prof. W. KLYNE.

## Amino Acids

A Project Group of CBN had issued a draft report on 'Nomenclature of Amino Acids' (May 1972). These rules revised and extended the 'Definitive Rules for the Nomenclature of Amino Acids' published by IUPAC in 1960 [*J. Amer. Chem. Soc.* **82**, 5575 (1960)]. Profs. HOFFMANN-OSTENHOF and LOZAC'H had agreed that the content and arrangement of the revised rules would be left to Dr. W. E. COHN (Secretary of CBN). Mr. KLESNEY and Dr. LOENING would review the document from the point of consistency with the rules of organic nomenclature.

## Condensed Version of the Blue Book

A Project Group, consisting of Drs. GRÜNEWALD, CROSS, and LOENING, was appointed to consider compilation of a condensed version of the 1971 edition of *Nomenclature of Organic Chemistry* (combined Sections A, B, and C).

With regard to cyclophanes, a Project Group, consisting of Dr. HIRAYAMA, Prof. VÖGTLE, and Dr. TH. KAUFFMANN, was appointed to prepare a document combining their three proposals into a common system. The system approved by the ACS Nomenclature Committee should also be considered. Rules were not necessary at this stage, but rather a delineation of principles with their consequences, their advantages and disadvantages.

## Isotopically Labelled Compounds

A Project Group, consisting of Prof. LOZAC'H, Prof. RIGAUDY, and Mr. KLESNEY, was appointed to prepare a document on isotopically labelled compounds. Dr. CROSS would distribute to the Commission a document dealing with British practice.

## Fundamental Stereochemistry

The tentative version of Section E of the Blue Book on 'Fundamental Stereochemistry' had appeared in *Information Bulletin* No. 35 (June 1969, pp. 36-80). It was desirable to publish a definitive version as soon as possible. All Members of the Commission should report any necessary changes to Prof. KLYNE by 1 October 1972. He would then prepare a definitive version.

## General Rules for Natural Products and their Derivatives

A revised draft of Section X—Natural Products and Related Compounds—was distributed by Dr. CROSS. Comments on this draft should be sent to him as soon as possible. Dr. CROSS would then make an improved draft for distribution to CBN and the Commission on Chemical Taxonomy.

## Special Rules for Natural Products

Brief consideration was given to the following subjects: cannabinoids, tetrapyrroles, indole alkaloids, lignins, prenoids, prostaglandins, tocopherols.

S. P. KLESNEY

## SECTION ON OILS AND FATS (VI.3)

Chester, 6-7 September 1972

*Present:* Dr. E. HEINERTH (Chairman), Drs. H. J. Vos, Dr. G. LOEW, Dr. K. A. WILLIAMS (Titular Members); Dr. J. CORNELIUS, Prof. E. L. DELVAUX, Prof. M. NAUDET, Mr. A. PETERSEN, Mr. J. P. WOLFF (Associate Members); Dr. H. BRÜSCHWEILER, Dr. J. GRACIAN-TOUS, Miss B. JACOBSBERG, Dr. Ö. LEVIN, Dr. P. R. E. LEWKOWITSCH, Mr. S. B. LINTZ CHRISTENSEN, Mr. B. M. MCGWYNNE, Mr. A. T. MÖLLER, Prof. R. MONACELLI, Dr. R. OHLSON, Prof. C. PAQUOT, Dr. J. POKORNÝ, Ir. J. B. ROOS, Dr. A. D. SCOTT, Dr. F. D. SNELL, Dr. M. TEUPEL, Drs. J. C. VAN DER WEEL, Dr. H. H. R. H. WENDT (National Representatives); Drs. F. VAN DEN AKKER, Mr. R. F. BARBOUR, Dr. C. CAROLA, Mr. L. V. COCKS, Mr. P. W. HENDRIKSE, Dr. E. KURUCZ, Mr. M. PIKE, Mr. L. J. R. PRITCHARD, Mr. D. C. REYNOLDS, Mr. B. TAYLOR, Mr. R. C. WOOLFALL (Observers); Dr. M. WILLIAMS (Executive Secretary IUPAC).

### Previous Meeting

A report on the meeting held in St. Gallen (1-2 July 1971) had been published in *Information Bulletin* No. 41 (November 1971, pp. 14-16).

### Membership

Dr. B. M. CRAIG had been appointed a National Representative for Canada to the Commission on Oils and Fats (VI.3.1).

Prof. G. JACINI had resigned as Titular Member. Consideration of a replacement was deferred to the XXVII IUPAC Conference (Munich, 1973).

Dr. E. M. SALLEE (Commission VI.3.1) and Dr. F. D. SNELL [Commission on Soaps and Oleochemicals (VI.3.2)] were resigning as USA National Representatives at the end of the present meeting.

### Chairman's Report

Close relations were being maintained with relevant national and international organizations dealing with standardization and development of methods of analysis, such as AOCS, BSI, CID, DGF, IASC, IDF, IOOC, ISO, OICC, and Codex Alimentarius. Some of these organizations were represented at the presented meeting:

IASC — Dr. K. A. WILLIAMS

IDF — Ir. ROOS

ISO — Drs. VAN DEN AKKER (Secretariat, ISO/TC 34/SC 6: Meat and Meat Products)

Six more standard methods, approved by the Section at previous meetings, were in course of publication by Butterworths in loose-leaf form, both in French and English. They would appear early in 1973 as the Second Supplement to *Standard Methods for the Analysis of Oils, Fats, and Soaps* (5th Edition, 1964):

II.D.7 Iodine value ( $I_1$ )

II.D.17 Determination of di- and tri-unsaturated fatty acids by UV spectrophotometry

II.D.20 Determination of epoxy-group oxygen

III.A.2 Determination of arsenic in glycerol (photometric method with silver diethyldithiocarbamate)

- IV.A.11 Determination of the unsaponified and unsaponifiable matter in soaps
- IV.A.12 Determination of minor quantities of glycerol in soaps (photometric method)

Dr. HEINERTH emphasized the importance of reviewing the methods published in 1964 and in the First Supplement (1966), revising and even eliminating where necessary. In future, the Section and its Commissions would be dealing more with biological and physical methods and modern instrumental techniques. Some suggestions were made for future work programmes.

### **Work Programme 1971-1972**

*Determination of Melting Point.* A Project Group under Prof. PAQUOT would discuss the various amendments to the proposed method.

*Determination of trans Octadecanoic Acids.* The method was adopted as a standard method. Prof. PAQUOT and Mr. HENDRIKSE would prepare the final text based on the various comments made.

*Composition of Fatty Acids by Gas Chromatography.* Two methods had been investigated, those of Dr. H. HADORN and Ir. ROOS. It was agreed that further work would be carried out on both methods and on an additional method (that of Christopherson and Glass). Consultations would also take place with ISO and IDF before a final decision was taken.

*Determination of p-Anisidine Value of Oils and Fats.* The only difference between the proposed method and earlier ones was the replacement of benzidine by the less toxic p-anisidine. Further discussion was deferred until the Project Group had met.

*Determination of Percentage of Palmitic Acid in the  $\beta$ -Position in Triglycerides with Pancreatic Lipase.* This was the first biological method studied by the Section. To date the results were not satisfactory. The work would continue after modification of the Spanish text by Mr. WOLFF.

*Detection of Propyl Gallate, Octyl Gallate, Dodecyl Gallate, BHA, and BHT in Oils and Fats.* After lengthy discussion it was decided to carry out collaborative tests on the method submitted by Ir. ROOS and that of ISO. Meanwhile, it would be suggested that ISO should defer any decision on an adopted method until after the results of these tests.

### **Work Programme 1972-1973**

In addition to the programmes continuing from the previous year, it was agreed to collaborate with AOCS in the study of an NMR method for the determination of solids in oils and fats.

Reports were received from the Melting Point, Pesticides, and Palm Oil Project Groups, which met separately during the course of the Section meeting at Chester. It was agreed to adopt the method for the documentation of p-anisidine value to replace that for benzidine value.

A commercial apparatus for oxygen absorption determination would be exhibited at AICHEM next year. Difficulty had been encountered with the construction of the apparatus described in last year's work programme. Further work would continue.

Further work on methods using NMR techniques were proposed. These included the amount of oil in seeds and total quantity of fats in margarine.

In future, some countries would require a declaration on the amount of biologically active linoleic acid in margarine. Arising from the work of the Codex Committee on Methods of Analysis and Sampling, the text of a



Canadian method 'Enzymatic Determination of Polyunsaturated Fatty Acids' would be circulated for discussion.

Following publication of a paper by Huang and Firestone, a revised method for the determination of *trans* acids by IR had been prepared by the Netherlands delegation. It was agreed that this would be examined during the coming year.

As a result of correspondence with the Palm Oil Growers' Council of Malaysia it was agreed that Dr. CORNELIUS would incorporate several agreed modifications into methods of analysis proposed by their Vegetable Oils Technical Committee. These would then be circulated to Members for comment.

Two methods for the determination of tocopherols in oils and fats would be the subject of collaborative tests during the year.

It was suggested that Commission VI.3.2 should undertake studies on the following subjects:

- (i) Study of Noncombustible Industrial Oils and Fats
- (ii) Determination of Sulphur, Mercury, and Other Trace Metals
- (iii) Heat Stability and Colour of Technical Products
- (iv) Heat Stability in Relation to Colour

A method for the gas chromatographic determination of fatty acid composition would be established in consultation with ISO, BSI, and NNI, based on a method proposed by the Netherlands.

H. J. Vos

## **MACROMOLECULAR DIVISION WORKING PARTY ON STRUCTURE AND MECHANICAL PROPERTIES OF COMMERCIAL POLYMERS**

**Lyon, 7 September 1972**

*Present:* Dr. A. J. DE VRIES (Chairman), Dr. M. CARREGA (Secretary), Dr. J. CHAUFFOUREAUX, Dr. E. A. COLLINS, Dr. J. HEIJBOER, Dr. J. MEISSNER, Prof. A. S. LODGE, Dr. H. H. MEYER, Prof. G. V. VINOGRADOV.

### **New Programmes**

All Members were invited to send their proposals to the Chairman as soon as possible. Solvay et Cie had already promised to send a proposal for a new programme on mechanical properties of PVC.

Prof. VINOGRADOV read a statement stressing interest in a programme on HDPE. The Chairman commented that HDPE had already been the subject of Working Party programmes, the results on the rheology of HDPE having been published in the paper 'A Collaborative Investigation into the Rheology of some Polystyrene and Polyethylene Melts' [*Pure Appl. Chem.* 20(3), 329 (1969)]. After some discussion it was decided that the worth of a new programme on HDPE could be discussed after completion of the present programme on LDPE. Prof. VINOGRADOV was invited to prepare a detailed proposal for such a new programme.

### **Future Meetings**

The next meeting would be devoted to LDPE and PVC rheology. It would be held in Germany on 26-27 February 1973, by kind invitation of Farbwerke Hoechst AG.

By then Dr. MEISSNER would have completed the last report on the experimental programme. Also, he expected to have started preparation of the final report to be published in the course of 1973.

No further experimental work would be done on the three LDPE samples, but small quantities were still available for interested Members. Because large quantities were no longer available, it was decided that future collaboration with the European Federation of Chemical Engineering Working Party was only possible on new samples. The contribution of the EFCE Working Party to a new programme on LDPE would be mainly concerned with processing characteristics, whereas the IUPAC Working Party would centre its principal activities on determination of the fundamental rheological characteristics and the relationship with molecular structure, processing and end-use properties.

It was also proposed that the Working Party should meet in conjunction with the International Symposium on Macromolecules in Aberdeen (10-14 September 1973).

M. CARREGA

## **COMMISSION ON MOLECULAR STRUCTURE AND SPECTROSCOPY (I.5)**

**Wrocław, 17 September 1972**

*Present:* Prof. N. SHEPPARD (Chairman), Prof. Y. MORINO (Titular Members); Prof. B. JEŻOWSKA-TRZEBIATOWSKA, Prof. E. R. LIPPINCOTT, Prof. C. N. R. RAO (Associate Members); Dr. R. N. JONES [Sub-Commission on Infrared and Raman Spectroscopy (I.5.1)].

### **Introduction**

The Chairman emphasized that this was not a full meeting of the Commission: its main purpose was to review the current programme. The last full meeting was held at Washington in July 1971 (see *Comptes Rendus XXVI Conference*, pp. 126-128).

### **Mass Spectroscopy**

At the XXVI IUPAC Conference, Council resolved that a Sub-Commission on Mass Spectroscopy (I.5.3) be established. One Titular Member of Commission I.5 was to be a specialist in mass spectroscopy and should make recommendations on the composition of the Sub-Commission. The Chairman reported that this Titular Membership position had not yet been filled, but action was expected in the near future. It was anticipated that two or three Members of the Sub-Commission would also be appointed before the XXVII IUPAC Conference (Munich, 1973).

### **ICSU Inter-Union Commission on Spectroscopy**

IUPAC had four Members on the ICSU Inter-Union Commission on Spectroscopy. The terms of office of two of these [Prof. Sir HAROLD THOMPSON (UK), Prof. R. C. LORD (USA)] expired this year. Profs. A. R. H. COLE (Australia) and Y. MORINO (Japan) had been nominated to replace them.

## Tables of Wavenumbers for Calibration of Infrared Spectrometers

Parts III and IV of these Tables, covering the range  $600\text{--}1\text{ cm}^{-1}$ , were approved at Washington. The final manuscript had since been completed under the editorship of Prof. COLE (Chairman, Sub-Commission I.5.1) and publication in *Pure and Applied Chemistry* was expected early in 1973 [Editorial Note. Published in *Pure Appl. Chem.* 33(4), 605 (1973)]. Hard-cover offprints would be available as a companion volume to Parts I and II [*Pure Appl. Chem.* 1(4) 537 (1960)].

The Chairman reported that about 2000 copies of Parts I and II had been sold and it ranked amongst the best selling IUPAC publications. It was the consensus that a continuing demand for these Tables could be expected; a new printing of Parts I and II would soon be necessary and it was recommended that Prof. COLE should appoint a small Project Group to report at Munich as to whether any revisions or additions to Parts I and II were required before proceeding with a second printing.

Extensions of the Tables into the nearer infrared, proposed last year by Prof. M. L. JOSIEN, should also be considered at Munich.

## Raman Spectra

'Recommendations for Presentation of Raman Spectra for Publication in Chemical Journals' [Tentative Nomenclature Appendix No. 11 (February 1971) to the *Information Bulletin*] had completed the statutory eight-month period in tentative form last October. Prof. LIPPINCOTT had received a few minor suggestions for changes which were incorporated in the definitive version. This version would come before Council for approval at the XXVII IUPAC Conference in 1973.

## Nuclear Magnetic Resonance Spectra

'Recommendations for the Presentation of NMR Data for Publication in Chemical Journals', adopted in definitive form at Washington, had been published in *Pure and Applied Chemistry* [29(4), 625 (1972)]. These recommendations applied principally to proton spectra. It was agreed at Washington that Prof. E. FLUCK and the Chairman should consider an extension to other nuclei. Consultations had been held in UK with the NMR Discussion Group and there should be more to report about this matter at Munich.

In discussion, concern was expressed about the uncontrolled proliferation of abbreviations such as PMR and CMR in the nuclear magnetic resonance literature.

## Mössbauer Spectroscopy

At Washington the Commission received from Prof. R. H. HERBER a report entitled 'Nomenclature and Conventions for Reporting Mössbauer Spectroscopic Data: Tentative Recommendations', prepared by an *ad hoc* Panel of the Numerical Data Advisory Board of the US National Research Council. This document was accepted by the Commission, subject to some editorial and terminological modifications, and referred to the Physical Chemistry Division Committee for processing as tentative specifications in an Appendix to the *Information Bulletin*. Subsequent progress had been slowed by the need to modify the symbolism and terminology to conform with IUPAC practice. A revised draft had now been prepared in consultation with the



Commission on Physicochemical Symbols, Terminology, and Units (I.1) and the Interdivisional Committee on Nomenclature and Symbols. This version had been referred back to the *ad hoc* Panel of the US National Research Council. The Commission Chairman and Prof. FLUCK should consult Prof. V. I. GOLDANSKI and Prof. N. N. GREENWOOD when the tentative recommendations were published. It was anticipated that the revised document would be acceptable and that publication could now proceed.

The Chairman noted that criticism had been voiced concerning the delays in processing this project to the present stage. Whilst it was essential that any technical document approved by IUPAC be fully checked for consistency with general IUPAC recommendations on units, terminology, symbols, and nomenclature, it would be helpful if means could be developed to accelerate this process.

### **Photoelectron Spectroscopy**

The Chairman reported that he and Prof. FLUCK were continuing discussions concerning terminology and symbolism for photoelectron spectroscopy with Prof. K. SIEGBAHN and others, but there were technical difficulties and nothing definite to report at the present time. The matter would need to be discussed at Munich.

### **Names and Symbols for Quantities used in Absorption Spectrophotometry**

At Washington proposals for the revision and extension of Section 2.8 (Light and Electromagnetic Radiation) of the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* were approved at a joint meeting of Commissions I.1 and I.5. A revision of Section 2.8, incorporating these modifications, had now been published in tentative form as Tentative Nomenclature Appendix No. 24 (June 1972) to the *Information Bulletin*.

It was noted that whereas the project was undertaken jointly by the two Commissions, the participatory role of Commission I.5 was not evident from the published tentative version. The Chairman was requested to draw this to the attention of the Physical Chemistry Division Committee and request that it be corrected when the definitive version appeared. Criticisms and comments should be referred to Commission I.5 as well as to Commission I.1.

### **Infrared Spectroscopy**

'Tentative Specifications for Measurement and Evaluation of Infrared Spectral Data for Documentation Purposes' were published in *Information Bulletin* No. 34 (April 1969, page 23), prior to the introduction of the system of Tentative Nomenclature Appendices. These specifications were based on a report submitted by the Coblenz Society. Technical developments resulting from the introduction of interferometric techniques of infrared spectrophotometry had made it advisable to withhold further action for the time being. Dr. JONES stated that a supplementary report from the Coblenz Society concerning interferometrically measured infrared spectra should be available before the next meeting of Sub-Commission I.5.1 at Munich.

### **Other Business**

Problems associated with the symbolism and presentation of electron spin resonance spectra were discussed. It was recommended that the Chairman

should consult with those active in the field to determine if any action by the Commission would be desirable. There might also be problems associated with the definition and symbolism of force constants which it might be useful to consider and Prof. T. SHIMANOCHI should be consulted. These topics might be placed on the agenda for the Munich meeting.

N. SHEPPARD

## **APPLIED CHEMISTRY DIVISION COMMITTEE (VI)**

**Le Bischenberg, Strasbourg, 20-21 September 1972**

*Present:* Dr. R. W. CAIRNS (President), Dr. W. GALLAY (Past-President), Dr. H. EGAN (Vice-President), Dr. W. W. MEINKE (Secretary), Dr. I. BOSUND, Prof. H. SUOMALAINEN, Dr. K. WEISSERMEL (Members); Dr. M. WILLIAMS (Executive Secretary IUPAC).

Chairmen (unless stated otherwise) of Sections in attendance: Food—Dr. EGAN; Fermentation Industries—Dr. A. F. LANGLYKKE; Oils and Fats—Dr. E. HEINERTH; Pesticides—Dr. D. C. ABBOTT; Water Quality—Mr. B. GÖRANSSON (Secretary).

### **Introduction**

Dr. CAIRNS explained that because the Division Committee was not closely acquainted with the work of each of the Sections, he had invited their Chairmen to be present to discuss the accomplishments and future plans in each case. Financial difficulties for the present year had imposed hardships on the Section Chairmen in regard to their plans for meetings in 1972. Hopefully, this was now behind them and one should be able to operate within a system of longrange planning and priorities.

Regarding the problems of *budget* it was agreed that Dr. CAIRNS should request of the Bureau that a firm budget be established for the Division prior to the beginning of a calendar year (preferably in September or October), so that its various Sections could begin to make firm plans for the year. In addition, it was requested that the IUPAC Secretariat should furnish the Division with cost accounting figures on a monthly basis to enable the President to keep track of the state of the Division funds.

It was agreed that the Division should adhere to the principle that every unit of the Division should meet at the XXVII IUPAC Conference in Munich (1973). The Executive Secretary anticipated that the Treasurer would be able to recommend to the Bureau that all IUPAC bodies could meet in Munich, with basic costs of travel and subsistence of Titular Members to be met from IUPAC funds. The one partial proviso would be that where people come from long distances, such as from Japan and USA, arrangements would be made for group flights to the meeting. In this case individuals would be allowed the amount of reimbursement of the group flight. If they preferred to make other arrangements and travel individually, then they would be expected themselves to provide the difference between group fare and travel costs.

Dr. WILLIAMS also pointed out that the Treasurer had agreed that if savings were made in the Division funds allocated for 1972, those savings would be available for use in the following year.

It was agreed that if there were constraints placed on Division programmes by a limited budget, these constraints would be effected by establishment of priorities amongst these programmes. Furthermore, Dr. CAIRNS stated that he would look to the Division Committee to help him in establishing these priorities. He pointed out that under the present Division structure, Sections lacked motivation\* for longterm planning of their programmes. One function of the current meeting was to discuss with the Section Chairmen their long-term objectives and thus to give the Division Committee some basis on which to establish priorities.

### Subventions for Symposia

There was considerable discussion about the matter of subventions for symposia. Dr. LANGLYKKE reported that the Fermentation Industries Section had been unsuccessful in obtaining IUPAC financial support for two meetings in the International Fermentation Symposia series in the past few years.

Dr. EGAN pointed out that often in the case of symposia, what was needed was a 'loan' provided a year or so in advance to invest in printed circulars, *etc.*, announcing the meeting. In many cases this kind of support could be at least partially repaid once the meeting had actually taken place.

It was thus resolved to ask the Bureau for permission to use \$1,000 of the 1972 residual funds for the Division as a grant for investment by the Division in IUPAC-sponsored symposia, the first of which would be the IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies (Hamburg, 29-31 August 1973). It would be expected that at least part of this sum would be reimbursed by the Organizers.

### SCOPE

Dr. GALLAY described the programme and current status of SCOPE, an ICSU Committee with about 22 members. He was the official IUPAC representative on SCOPE. Its mode of operation was to accept individual projects, amongst which were presently the following:

- (i) Global environmental monitoring
- (ii) Manmade eco systems
- (iii) Methodology for determination of pollutants
- (iv) Ecotoxicology
- (v) Institutional arrangements for environmental problems
- (vi) International registry of data about chemicals in the environment
- (vii) Programme for analysis of world eco systems
- (viii) Interactions between environmental transformations and genetic and demographic systems
- (ix) Environmental problems in developing countries
- (x) Model building and ecological systems
- (xi) International research on human response to environmental hazards
- (xii) Acoustical environmental problems

Dr. GALLAY and IUPAC were highly involved in the third project above, namely, Methodology for Determination of Pollutants. A Standing Committee was working on this methodology under the direction of Dr. GALLAY and at present it had about 30 methods ready for publication with 20 additional methods in process. They considered their purview to be *substrates* of water, air, soil, and biological tissue, and they were confining their considerations to the ambient measurements appropriate on a global scale.



It was agreed that the Division Committee and Section Chairmen should be kept informed of the activities of SCOPE by the Division Secretary, who would circulate minutes and reports of SCOPE and its activities received from Dr. GALLAY. It was apparent from Dr. GALLAY's remarks that SCOPE, although only three years old, was a very important global organization concerned with environmental problems. Furthermore, the Applied Chemistry Division must have continuing liaison with SCOPE to safeguard the interests of the Division and of IUPAC: the official IUPAC representative on SCOPE might advantageously be a member of the Applied Chemistry Division Committee. (This was, of course, satisfied at present by Dr. GALLAY who was already on the Division Committee.)

### Food Section

Dr. EGAN discussed the present status and future plans of the Food Section. A large part of the present work was analytical, but this was important in order to develop good procedures to define the level of contaminants in food products. Such measurements permitted decisions to be made as to whether certain contaminants were indeed a problem. Close cooperation and liaison was maintained with other international organizations such as IUFOST and ICC.

One difficulty was mentioned in terms of publication of certain reports developed by the Section. Apparently in the past there had been a reluctance to publish certain of these documents in *Pure and Applied Chemistry*, yet there were other publication media that would be very happy to take such material. Therefore, it was agreed that the Division would continue to submit to *Pure and Applied Chemistry* reports of its Sections as in the past. However, if the Committee on Publications turned down publication in that medium, then Section Chairmen should feel free to publish their reports elsewhere. This could include the *Information Bulletin* and its Appendices, but such publication should be entirely within their discretion, and the Chairmen should feel free to publish in *J. Assoc. Off. Anal. Chem.*, *J. Cereal Chem.*, etc.

It was agreed that the Division Secretary and the Section Chairmen should develop procedures whereby Division Officers were kept informed of the progress of publications. The Secretary would draw up a form which could be used within the Division as a publication was being presented to *Pure and Applied Chemistry* for acceptance. In this way the Division President would be able to lend his support to any particular publication problems which might arise within the Division.

The Executive Secretary pointed out that *Pure and Applied Chemistry* was now anxious to increase its content of good 'applied material', both from symposia and Division reports. He encouraged the Division to try and provide suitable material for consideration by the Committee on Publications. Dr. WILLIAMS also drew attention to the successful publication through Butterworths, within three months of the meeting, of the main papers from the XXIII IUPAC Congress (Boston, 1971). This had been possible by photooffset printing directly from the lecturers' manuscripts.

Returning to the future plans for the Food Section, Dr. EGAN pointed out that it would be possible for the Section to become more involved in the resources aspect of foods. Indeed, one of the sections at the IUPAC-IUFOST Symposium in 1973 would be Development and Evaluation of New Proteins. Out of those discussions should come a much better appreciation as to the need for IUPAC to be involved in this area. This aspect of the food pro-

gramme would be quite different from the analytical programme which was essentially health agency motivated.

### **Fermentation Industries Section**

Dr. LANGLYKKE discussed the programmes of the Fermentation Industries Section. He pointed out that the programmes identified with certain international meetings that were held periodically on the practical application of the microbial process. The Section was also involved in standards and quality control of fermentation products, specifically in establishing procedures whereby one could reproducibly measure or standardize dry yeast. More recently it had become involved in the single cell protein problem, which would be a longterm project. Other problems on which the Section was working included those of pollution and waste disposal.

Dr. LANGLYKKE felt that there was a need for a better approval mechanism for IUPAC on publications. Furthermore, he would like to see a better definition of the purposes and objectives of IUPAC both by definition and by example. To this Dr. GALLAY pointed out that there were new brochures coming out which might prove satisfactory for this purpose.

Dr. GALLAY mentioned the value of BOD (Biochemical Oxygen Demand) that he felt might be obtained through the microbial process. Also, it was pointed out that the fixing of nitrogen containing organisms fell within the purview of this Section.

### **Oils and Fats Section**

Dr. HEINERTH described the programme of the Oils and Fats Section, which had been in operation since 1936 within the framework of IUPAC. It was purely analytical in nature and the end result was a compilation of *Standard Methods for the Analysis of Oils, Fats, and Soaps*, which was published by Butterworths and was now in its fifth edition.

As a result of the discussion of the work of these three Sections Dr. EGAN suggested that sometime during the IUPAC Conference in Munich in the summer of 1973, a closed meeting should be scheduled specifically to discuss areas of cooperation and overlap between them.

### **Pesticides Section**

Dr. ABBOTT discussed the programme and future plans of the Pesticides Section. He pointed out that the work was confined to residues of the pesticides and not the formation or specifications of pesticides themselves. Furthermore, all the work was basically aimed at food and there were major important links with WHO/FAO and Codex Alimentarius. The end result of the chain was to establish tolerances for residues of pesticides allowed in foods in international trade.

This area could be broken down into three categories. First, toxicological data which was not within the province of IUPAC but was covered by WHO. Next, the nature of terminal residues of the pesticides which was covered by a Commission of the Section and thirdly, procedures suitable for enforcing regulations. Dr. ABBOTT then described in detail the very close cooperation and interaction between the Section and WHO/FAO as well as with CEE and OECD.

Dr. GALLAY pointed out that IUPAC was planning to approach FAO for funding of specific work, such as that on pesticide residues. There had been an earlier concern of certain IUPAC Members that if IUPAC approached

FAO for funds there would be a loss of face. It was agreed, however, that the current leadership felt there was no problem here, and that IUPAC should try wherever possible to obtain financial support. However, Dr. ABBOTT pointed out that he believed FAO was itself currently under rather stringent budget limits.

### **Water Quality Section**

Mr. GÖRANSSON summarized the current efforts of the Water Quality Section. He pointed out that the present programme was directed almost entirely to a study of the technology of water pollution abatement within industry. The Section was organized so that each Member was responsible for a group of industries. They were aware of the more general pollution problems in the water area, but felt that ISO was the proper organization to deal with those aspects of water purity. The Section planned to offer liaison to ISO and would receive all working documents from its relevant Technical Committee. Dr. GALLAY felt it was important to continue liaison with COWAR through Prof. E. A. PEARSON, who was a Section Member. It was further pointed out that there could surely be good cooperation between the Fermentation Industries Section and the Water Quality Section, particularly in terms of microbial approaches to purifying water.

Later on in the discussion it was felt that the programme of the Water Quality Section should be broadened somewhat and, because the Section had only one Associate Member at present, Dr. CAIRNS encouraged the Section to add additional such Members selected from the point of view of their capabilities in particular industrial processes and techniques rather than by industry.

### **Future Plans for the Division**

These discussions were held in an Executive Session of the Division Committee in the absence of the Section Chairmen. They were started by Dr. CAIRNS reviewing the deliberations of the *ad hoc* Committee on Applied Chemistry (Frankfurt/Main, 1970), in which a reorganization of the Applied Chemistry Division was proposed and the suggestion made that industrial members be added to Commissions throughout the whole of IUPAC.

Dr. GALLAY felt that the purview of the **Air Quality Section** could be enlarged to cover the entire field of air chemistry. This would broaden its activities beyond just the analysis of trace contaminants. Furthermore, it was pointed out that it should be involved in the entire spectrum of air quality, emissions through ambient, and in general the only overlap with SCOPE was in the ambient worldwide area. The area of sampling presented major problems which could itself constitute an important challenge to this Section.

One apparent difficulty was the present composition of the Section. It was pointed out, however, that there were plans to transfer the body fluids activity of the Section to the Clinical Chemistry Section. This would open up the possibility for adjusting the membership to deal with some of the broader problems.

It was agreed that Dr. CAIRNS, Dr. MEINKE, Dr. GALLAY, and Mr. J. L. MONKMAN (Chairman of Air Quality Section) would get together sometime in the near future to discuss the overall plans for the future of the Air Quality Section. These plans would include the future of the manual of methods which had been published for several years by this Section through Butterworths.



Dr. BOSUND mentioned his interest in the discussions during the meeting and promised to put his ideas down in a letter to the Division President. He felt that there was need for additional effort in the **Food Section** on chemical modification of food ingredients, and would spell out some of his thoughts in the letter.

The point was raised as to whether the Division would be better off if more of its Sections were identified with industry, such as Food Industry Section, Oils and Fats Industry Section, *etc.* Dr. CAIRNS replied that the tendency through the reorganization was to get away in the name from such specific orientation. However, industrial contribution to the work of the Sections should definitely be encouraged.

Dr. CAIRNS asked for comments and advice in terms of the *solid waste problem*. From the discussion it became apparent that the Division Committee felt the Division should be involved in this area although its efforts should be focussed more on recycling and conservation aspects of solid wastes rather than on pollution aspects. Dr. CAIRNS would plan to set up the three man *ad hoc* Committee accordingly to study this area and he requested suggestions for members of this Committee from those present.

In answer to some of the comments about why so much of the Division's programme was oriented towards analysis, it was pointed out that analytical procedures were easier to consolidate internationally because they did not involve the problem of industrial secrecy, which often became evident in discussions of industrial process technology. Nevertheless, Dr. WEISSERMEL thought that one way of broadening the perspective of some of the Sections might be to become involved in developing new methods to *remove* traces of particular contaminants.

There was some discussion as to whether there would be any advantage to the Division to make all of the Sections into Commissions. It was agreed that such an action would be possible, but that this would reduce the flexibility of operation of certain of the units in the Division. As an alternative, Dr. GALLAY pointed out that sometimes the full complement of eight Titular Members was not required for every Section or Commission programme and thus perhaps the Division Committee should look to see whether there were units whose work could be effectively carried out with a reduced number of Titular Members.

In favour of a Section-Commission structure, Dr. EGAN pointed out that the Section provided a useful management function whereas the individual Commissions under it were the units that did the actual work of the Division.

Throughout the discussions it was obvious that there were a number of areas of overlapping interests amongst Sections within the Applied Chemistry Division, as well as amongst Divisions within IUPAC, and between outside organizations and IUPAC.

It was agreed that part of the Division Committee meeting at the beginning of the Munich Conference should be set aside for discussions by the Chairmen and Secretaries of the individual Sections as to areas of possible mutual interest and overlap. Liaison between the Analytical Chemistry Division and the Applied Chemistry Division should be provided through the respective Division Secretaries. It was planned to exchange minutes of meetings and notes on areas of mutual interest. It was hoped also that Section Officers would keep the Division Secretary informed of areas in which they thought there should be liaison with the Analytical Chemistry Division. It was noted that there had already been a good example of interaction between the two Divisions in relation to the CEE contract work.

Finally, it was agreed that it was very important to maintain good liaison with other appropriate international organizations. In certain instances, *e.g.*, IUFoST, the appointment of an Associate Member from that organization to the IUPAC Food Section might be appropriate.

W. W. MEINKE

## COMMISSION ON HIGH TEMPERATURES AND REFRACTORY MATERIALS

Paris, 11-12 October 1972

*Present:* Dr. W. S. HORTON (Chairman), Prof. G. D. RIECK (Secretary), Prof. C. B. ALCOCK, Prof. R. COLLONGUES, Prof. E. FITZER (Titular Members); Prof. F. CABANNES, Prof. J. HLAVÁČ, Prof. G. DE MARIA (Associate Members); Dr. ATMA RAM, Prof. J. DROWART, Prof. A. MAGNÉLI, Dr. B. C. H. STEELE (National Representatives); Dr. R. W. OHSE (Observer).

### Vapour Pressures

Reports on the vapour pressure standards gold, silver, and cadmium, had already been published by the Commission in *Pure and Applied Chemistry* [31(3), 371 and 395 (1972)]. The Chairman mentioned that experimental work on platinum had been carried out by several laboratories, whereas that on tungsten only by one laboratory. For that reason the Project Group would not recommend tungsten as a standard similar to gold, silver, and cadmium. Prof. RIECK raised the question of the purity of the tungsten used and Prof. DE MARIA pointed out that no equilibrium pressures were measured. According to Prof. ALCOCK this would mean at most a factor 2 difference.

### High Temperature Bibliography

The possibility to publish through a commercial firm appeared small because the editors and all contributors worked without compensation and the publication was a nonprofit activity. The annual costs were now about £900 whereas the income was about £600. The Commission suggested to raise the price to at least £2 per annum and consider higher fees for organizations in contrast to individual subscribers. Apart from this it would be investigated whether IUPAC would print (and distribute) the Bibliography. The suggestion was made that the National Organizations might be willing to contribute.

It was accepted that an Associate Editor be appointed by Dr. M. G. HOCKING. An Editorial Committee had been appointed to handle editorial problems other than finance: Dr. HOCKING, Prof. FITZER, Prof. RIECK, Dr. STEELE. Prof. RIECK would be the Chairman.

### Melting Points

Prof. M. FOEX, together with eight people interested mainly in oxides and two mainly interested in metals, was now active in this field.

Materials for temperature standards could possibly be based not only on melting points but also on crystallographic transformation points and eutectics of binary oxide systems. If oxides like  $Y_2O_3$  were used, attention ought to be paid to their availability as chemically pure substances, defects in stoichiometry and structure stability, and compatibility with container materials, especially at high temperatures.

Prof. FOEX had distributed samples of  $Y_2O_3$  amongst the Project Group members. Their measurements would be compared and evaluated. The Commission asked Prof. FOEX to consider in his report the above-mentioned points. After that the Commission could decide whether it would recommend  $Y_2O_3$  as a standard or reference material.

Perhaps some members of the Project Group could look into the possibility of also using metals as standards. The Commission urged Prof. FOEX to seek as much information as possible on the use of metals from those workers who would use them. Prof. FITZER mentioned that another group had already redetermined the melting point of tungsten. A sample bank (e.g., at US National Bureau of Standards) would be useful. It was suggested that the Commission should seek exchange of information with other international bodies dealing with temperature standards, such as the Ten Year Temperature Conference.

Prof. CABANNES would write to Prof. FOEX about the above-mentioned views of the Commission and encourage him to continue with the project.

### Conference on High Temperature Techniques

Prof. ALCOCK sought the advice of the Commission on several points. It was decided to call the meeting 'Symposium on Physico-Chemical Techniques at High Temperatures'. It would be held from 3 to 7 September 1973 in Baden near Vienna, simultaneously with the III International Conference on Chemical Thermodynamics, which was being organized by the Austrian Chemico-Physical Society together with IUPAC. In the second circular mention would be made of the Symposium as well as the Thermodynamics Conference. The arrangements would be such that fields of common interest could be attended by participants of both meetings.

The Commission agreed on six main topics for the Symposium. In each topic session of half a day, two invited lectures plus a number of submitted papers would be presented and a panel discussion would conclude the session. Members of the panel would be all speakers and a 'moderator' from the Commission, if possible. The topics and moderators were:

- |   |                 |
|---|-----------------|
| (i) Generation and Measurement of High Temperatures | — Dr. OHSE      |
| (ii) Structural Studies                             | — Prof. HÄGG    |
| (iii) Calorimetry                                   | — Prof. ALCOCK  |
| (iv) Vapour Pressure                                | — Prof. DREWART |
| (v) Electrochemistry                                | — Dr. STEELE    |
| (vi) Kinetic Measurements                           | — Dr. HORTON    |

The invited lectures might be published through IUPAC, but the other authors would be free to publish their papers in the journal of their choice. Each author would be asked to submit an abstract before 1 February 1973 and an eight-page manuscript before 15 May 1973. Preprints of these manuscripts would be available for the participants before the Conference. Every Commission Member would try to have announced both Conference and Symposium in chemical and other relevant journals in his country. Prof. ALCOCK would provide a suitable text for these announcements.

### Hot Corrosion

After an oral report from Prof. FITZER the feeling was that, at the moment, the Commission could only observe what some groups already active in this field were doing, and if necessary coordinate some of the efforts and act as a clearing house. Prof. FITZER agreed to maintain these contacts.



## **Carbon Monograph**

Prof. FITZER had spoken with a number of scientists working in the field of carbon. They, and more generally the national committees on carbon, all agreed that standardization and nomenclature for the various forms of carbon were important. It seemed possible that the different committees would on their own initiative carry out this work and that afterwards the Commission could make a recommendation to IUPAC on that basis. Dr. HORTON and Prof. FITZER would act on behalf of the Commission.

## **High Temperature X-Ray Work**

Prof. RIECK had contacted Officers of IUCr with the result that a renewed Commission of IUCr was formed with Prof. FOEX as Chairman. The objects of the Commission would be:

- (i) To locate people interested in this field.
- (ii) To edit books, papers, and bibliographies (as was done by GOLDSCHMIDT in 1964 and later by J. P. TRAVERSE).
- (iii) To organize a meeting in 1975.
- (iv) To organize task forces for interlaboratory projects, especially for temperatures above 2000 K.

If Prof. FOEX specified standard materials (such as carbon, tungsten, alumina), Prof. FITZER would try to find people willing to measure certain standards. (Suggestions of names should be sent by members to Prof. FITZER.)

## **Silicon Nitride**

Prof. FITZER advised that the Commission should not yet become involved in this problem. It was too early for standardization because the data were not good enough. At the next meeting Dr. STEELE would report about a UK programme in this field.

## **Past Publications**

A list was being compiled of all past publications of the Inorganic Chemistry Division and each Commission had been asked for the titles in its field. Prof. COLONGUES would ask Prof. TROMBE about an earlier report concerning the Commission. Members would send to the Chairman all information they had on this point.

## **Membership**

All six Titular Memberships expired in 1973. Dr. HORTON and Prof. COLONGUES could not be reelected for a third term (only in very exceptional circumstances). In view of the increased interest in the work of the Commission, the Chairman was asked to investigate the possibility to have eight Titular Members from 1973.

Prof. U. COLOMBO wished to be replaced as National Representative for Italy. The Commission would pass on Prof. COLOMBO's suggestion of Dr. D. CADORIN (Istituto Donegani) as his successor.

Dr. N. F. BRIGHT wished to retire as a contributor to the Bibliography and as National Representative for Canada. Prof. ALCOCK would deal with the replacement as Contributor. The Commission unanimously agreed to suggest that Dr. BRIGHT should retain his post as National Representative until he actually retired from scientific work. It was decided that a new Representative need not yet be requested.

G. D. RIECK

# INTERDIVISIONAL COMMITTEE ON MACHINE DOCUMENTATION IN THE CHEMICAL FIELD

Paris, 15-16 October 1972

*Present:* Prof. J. E. DUBOIS (Chairman), Dr. J. B. VAN EYK VON VOOR-  
THUYSEN, Dr. H. SCHENK, Dr. C. SUHR, Dr. F. A. TATE (Members); Prof.  
N. LOZAC'H (Commission on Nomenclature of Organic Chemistry), Dr.  
M. A. PAUL (Commission on Physicochemical Symbols, Terminology, and  
Units), Mlle. M. ORFUS, Dr. M. VIELLARD (Observers); Mr. R. J. M.  
RATCLIFFE (Assistant Secretary IUPAC).

## Minutes of Previous Meeting

The minutes of the meeting held in Washington on 16 and 20 July 1971 (see *Information Bulletin* Nos. 42/43, July 1972, pp. 6-8) were approved. Dr. TATE pointed out that CAS was not yet able to supply data based on its operational experience in using computer-programmed conversion of *Chemical Abstracts* index names into the corresponding machine cipher derived by programme from structural diagrams recorded in computer-readable form. This would be circulated within the Interdivisional Committee as soon as it was available.

## Membership

Dr. R. N. JONES had tendered his resignation from the Interdivisional Committee. After discussion it was agreed to seek a replacement from UK who would also act as Secretary to the Committee. Prof. DUBOIS would discuss this nomination with the appropriate authorities.

It was probable that a further vacancy would arise at the XXVII IUPAC Conference (Munich, 1973). Meanwhile, Prof. DUBOIS would write to Prof. S. FUJIWARA to ascertain his continued interest in the work of the Interdivisional Committee and to invite him to attend the meetings in Munich as an Observer.

Discussions had taken place between Prof. DUBOIS and CODATA and it was unanimously agreed to invite CODATA to nominate a permanent representative to the Interdivisional Committee. Prof. DUBOIS would write to the President of CODATA on this matter.

## Reports from Prof. Fujiwara

Japan had several major programmes in machine documentation, both governmental and nongovernmental. The Interdivisional Committee welcomed these reports and considered they provided useful information with regard to the programmes in which Prof. FUJIWARA was involved.

## Reports from Committee Members

Dr. TATE submitted three papers for discussion:

- (i) Tasks of the Interdivisional Committee on Machine Documentation in the Chemical Field
- (ii) A Computer-based System for Handling Chemical Nomenclature and Structural Representations
- (iii) IUPAC Nomenclature System and Use of the Computer in Handling Chemical Nomenclature

It was agreed that IUPAC nomenclature at present did not have a unifying

basis upon which future nomenclature rules could be formulated. The prime difficulty was in the field of ring structures, where there were now seven systems in operation and a further four planned. IUPAC should devote its efforts to systematizing these as a primary task.

CAS had a project based on this matter scheduled for completion in 1977, involving of the order of 5000 basic graphs from which it would be possible to establish systematic rules. The registry to be published next year, incorporating 2.3 million compounds, would allocate a registry number to each of these. In addition, a cross reference for systematic and trivial names would also be published. Approximately 250,000 names would be added per annum.

The aim of the Interdivisional Committee should be for a dictionary of ring structures which had a basis of agreement with the CAS proposals, because the latter were for internal use by that organization. Once the basic work had been accomplished it would be possible to establish further families.

Problems would arise because, although this system was useful for input, it might not be the optimum system for retrieval. The need to generate a compound on display involved drawing curved lines, requiring a high degree of complexity.

CAS in its system would input 60-80,000 graphic structures and hoped to develop output displays by 1975. Dr. TATE agreed to supply a report entitled 'Unique Chemical Registry Record' on the proposed system, for critical analysis by the Interdivisional Committee before the next meeting together with the report of the Los Angeles Open Forum in 1970 on Computer Ordering Problems.

It was stressed that IUPAC should not be involved in index nomenclature but should be concerned with bridging the various nomenclature systems. This required fewer general rules with simpler concepts. It was not the function of the Interdivisional Committee to create new nomenclature but to collaborate with the existing IUPAC Nomenclature Commissions in its formulation.

Prof. DUBOIS mentioned that the possibility of a free use of the Registry Number as a link number would be very beneficial to the various users of chemical information processing systems. Dr. TATE pointed out that CAS raised no objection to such a proposal: once a Registry Number had been assigned to a given compound by CAS, it might be freely used by the chemical community.

Two reports from Dr. SUHR

- (i) Structural Formulae Nomenclature and Documentation
- (ii) Naming of Ring Structures

further emphasized the problem, particularly the need for good screening where identification of rings within rings was involved.

Furthermore, Dr. SUHR undertook to have the first report updated and if possible to persuade Dr. NICHOLSON to publish his latest views. He would also amplify the second report in light of the present discussions.

Prof. DUBOIS would circulate a report analysing his views on these problems.

### **Standing Orders**

After lengthy discussion, in which the importance of consultations with IUPAC Nomenclature Commissions was stressed, draft Standing Orders of the Executive Committee regarding composition and terms of office and terms of reference for the Interdivisional Committee were approved.



## UNISIST

Prof. DUBOIS had attended, as the official IUPAC representative, the Inter-governmental Conference on UNISIST (Paris, 4-8 October 1971) and his report had been circulated to the Interdivisional Committee. He emphasized that this inaugural meeting had been dominated more by political influence than scientific thinking.

## ISO/TC 97

Dr. R. WIGGINTON (CAS) had represented IUPAC at a meeting of ISO/TC 97 (Computers and Information Processing) in Venice on 20-22 June 1972. His report had been circulated. The Interdivisional Committee considered that liaison with the following Sub-committees of ISO/TC 97 was desirable:

- SC 1—Vocabulary
- SC 2—Character Sets and Coding
- SC 7—Documentation of Computer-based Systems

Prof. DUBOIS would be attending a meeting of ISO/TC 97 in Paris on 19-20 October 1972 and would reemphasize the need for close collaboration in these fields. It was important that IUPAC should receive documents at the draft proposal stage for critical comment.

## Proposed Colloquium

An exchange of correspondence had taken place with the Organizing Committee of the XXIV IUPAC Congress (Hamburg, 1973) in relation to Section 7 entitled 'Symposium on Information and Communication in Chemistry'.

It was agreed that Prof. DUBOIS should indicate to the Organizing Committee that IUPAC, through its Machine Documentation Committee, could play a vital role in this Section by providing speakers at the various levels of the Symposium.

Drs. SUHR and TATE indicated their willingness to provide papers and Prof. DUBOIS suggested that a main lecture on 'Large Data Populations and Heuristic Approach of Correlation of Properties' would be appropriate.

Prof. DUBOIS and Dr. SUHR would initiate urgent action on this matter.

## Nomenclature Programmes in Progress and Planned by IUPAC Nomenclature Commissions

Representatives of the Commissions on Physicochemical Symbols, Terminology, and Units and on Nomenclature of Organic Chemistry attended for this agenda item. Prof. LOZACH submitted a report outlining present IUPAC projects in organic nomenclature. From the ensuing discussion the main problem to be resolved concerned numbering, because this would enable a decision on fragmentation to be reached. Although the Geneva Rules had been discarded it might now be opportune to reconsider this system as a basis for achieving the objective of automatic generation of acceptable nomenclature. It was important not to rely solely on tradition but to introduce rationalization where appropriate. Nomenclature should be based on the sequence: concept → principles → rules.

It was essential that close cooperation should be maintained in future between the Nomenclature Commissions and the Committee on Machine Documentation. It was agreed that Dr. VAN EYK VON VOORTHUYSEN would prepare a summary of the present world art of the subject, based on the

style of the Information Bulletin of EUSIDIC. Furthermore, this document should be under constant review.

In addition, Prof. DUBOIS would compile a selection of existing documents for circulation to all Nomenclature Commissions on principles to be followed in revisions of nomenclature. The importance of submitting all proposed nomenclature to the Interdivisional Committee at an early stage would be stressed.

Prof. LOZAC'H would prepare a list of current problems in organic nomenclature requiring advice on machine documentation procedure for circulation to the Interdivisional Committee. Dr. SCHENK would collate the comments of Members.

The Commission on Physicochemical Symbols, Terminology, and Units had produced the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* in 1969. It was generally agreed that transference of this data to computers could be carried out with little difficulty. Originally it was thought that use of italic and bold-faced systems might prove a problem, but it was envisaged that in 5-10 years computers would be programmed to take account of these requirements.

### **Any Other Business**

Prof. DUBOIS agreed to prepare discussion papers on the following topics:

(i) History of Chemical Rings

(ii) Importance of Stereoisomerism Homogenous Apprehension for Handling Chemical Nomenclature and Structural Representation

Dr. TATE agreed to prepare a position paper on the 'State of Art in Chemical Abstracts Service in Stereochemistry'. This would deal with accomplishments and not merely proposals.

J. E. DUBOIS

## **COMMISSION ON PHYSICOCHEMICAL SYMBOLS, TERMINOLOGY, AND UNITS (I.1)**

**Paris, 17-18 October 1972**

*Present:* Dr. M. A. PAUL (Chairman), Prof. M. FAYARD (Secretary), Dr. J. KOEFOED, Dr. D. R. LIDE, Jr., Dr. A. PEREZ-MASIÁ, Dr. A. SCHUIJFF, Prof. K. G. WEIL, Prof. D. H. WHIFFEN (Titular Members); Mr. R. W. FENNELL, Prof. B. TRÉMILLON, Prof. H. VAN OLPHEN (Observers); Mr. R. J. M. RATCLIFFE (Assistant Secretary IUPAC).

### **Manual of Symbols and Terminology for Physicochemical Quantities and Units**

Appendix II to the Manual, *Definitions, Terminology, and Symbols in Colloid and Surface Chemistry—I*, had recently been published [*Pure Appl. Chem.* **31**(4), 577 (1972)]. Part II, draft tentative nomenclature recommendations for heterogeneous catalysis, was placed before the Commission by Prof. VAN OLPHEN [Secretary of Commission on Colloid and Surface Chemistry (I.6)]. Commission I.1 felt that in view of the length of this document and of the detail included on the definitions of terms, Commission I.6 should consider combining Parts I and II to be issued ultimately as a separate bound volume, with only the index of terms and symbols to be retained for publication as part of the Manual.

The tentative version of *Electrochemical Definitions and Symbols* [Commission on Electrochemistry (I.3)] would be published in November 1972 as Tentative Nomenclature Appendix No. 28 to the *Information Bulletin*. The manuscript was briefly reviewed. Prof. KOEFOED was requested to communicate to Dr. R. PARSONS (Vice-Chairman of Commission I.3) the suggestion that the symbols  $\mathcal{E}'$  and  $\mathcal{Q}'$  in Sections 2.7.1 and 2.7.2 be changed, respectively, to  $\mathcal{E}_c$  and  $\mathcal{Q}_c$  to be consistent with the practice recommended in the Manual and that attention should be given to this suggested change throughout the document.

Working with the Commission on Molecular Structure and Spectroscopy (I.5), Section 2.8 (Light and Related Electromagnetic Radiation) of the Manual had been completely revised and published as Tentative Nomenclature Appendix No. 24 (June 1972) to the *Information Bulletin*. No comments on this document had been received as yet. The Commission felt that a bridge was missing between the present definition of internal transmission density or absorbance (2.8.13.1) and the absorption coefficient for a solute in a solution. It was suggested that a symbol was needed for relation absorbance of solution of a solute substance compared with pure solvent

$$\log_{10}\left(\frac{1}{T}\right)_{\text{solution}} - \log_{10}\left(\frac{1}{T}\right)_{\text{solvent}}$$

and that the symbol for that quantity be used in the definition of the absorption coefficient of the solute substance in solution.

Certain discrepancies were noted between the Manual and the 1970 BIPM publications *Le Système International d'Unités* (SI) and its translation into English. Specifically, certain units described in the Manual as to be progressively discouraged had been recognized by CIPM as playing a role so important that it was necessary to retain them for general use with the SI, e.g.

minute ; hour ; day ; liter . . .

Certain other units outside the SI had been recognized by CIPM as useful in specialized fields of scientific research because their values expressed in SI units had to be obtained by experiment and therefore were not known exactly, e.g.

electronvolt ; atomic mass unit . . .

Still others had been recognized by CIPM as preferable to be maintained temporarily because of the force of existing usage, e.g.

ångström ; barn ; bar ; normal atmosphere ; curie . . .

The Commission felt no immediate need to revise the Manual but concurred that at such time the Manual was revised such discrepancies with the recommendation published by BIPM should be reviewed.

### Reporting of Mössbauer Spectroscopic Data

The Commission had received copies of a letter from Prof. N. SHEPPARD (Chairman of Commission I.5) with a draft report on nomenclature and conventions for reporting Mössbauer spectroscopic data. After discussion of this report Prof. WHIFFEN agreed on behalf of Commission I.1 to transmit to Prof. SHEPPARD a summary of suggested modifications needed in that document.



## **Classification and Nomenclature of Electroanalytical Techniques**

The draft tentative manuscript of this document, prepared by the Commission on Electroanalytical Chemistry (V.5), was discussed with Prof. TRÉMILLON (Commission V.5) and Mr. FENNELL (Secretary of Analytical Chemistry Division). Discussion was focused on the desirability of using *I* as the general symbol for electric current. Commission I.1 concurred that *I*, (*i*) might be included in this document with an explanatory sentence in the Introduction to the effect that *I* was preferred, as a general symbol of a basic unit, although some electroanalytical chemists had been using *i*. Commission I.1 concurred also that the expression 'electric potential' might be used in lieu of 'electric potential difference' after initial introduction of both expressions as equivalent terms for the same physical quantity.

## **Quantum Chemistry**

The Commission discussed briefly whether there was a need for standardization of terminology and abbreviations for computation procedure used in quantum chemistry and for standardization of quantities and units also used in quantum chemistry. It was agreed that the Chairman should draft a statement of the problem, inviting comments from quantum chemists for dissemination through suitable publications such as the *Quantum Chemistry Program Exchange Newsletter*.

## **UNISIST**

Dr. PEREZ-MASIÁ raised the question of whether collaboration with the UNISIST programme of UNESCO in the field of physical chemistry should concern the Commission. He suggested that categorization of concepts and terms for storing and retrieving information in this field might be needed as the contribution by chemists to the general programme of UNISIST. The Chairman undertook to look into this question with appropriate individuals concerned with UNISIST. Dr. PEREZ-MASIÁ undertook to discuss the question with Prof. COULOMB, President of ICSU.

## **Interdivisional Committee on Machine Documentation in the Chemical Field**

The Chairman reported on a meeting he had just attended as an Observer of the Interdivisional Committee (see this Bulletin, pp. 45-48). The Interdivisional Committee was concerned with the impact of electronic computers on the storage, retrieval, and use of chemical information, and whether chemical nomenclature and terminology needed modification to take full advantage of computer technology. The Commission expressed interest in the programme of this Committee and would collaborate in appropriate ways.

M. FAYARD

## **MACROMOLECULAR DIVISION WORKING PARTY ON MOLECULAR CHARACTERIZATION OF COMMERCIAL POLYMERS**

**Brussels, 17 November 1972**

*Present:* Dr. HEYNS (Chairman), Dr. BALL, Prof. BENOIT, Dr. CERVENKA,

Dr. COUSIN, Dr. CROUZET, Dr. GEORGES, Dr. GLENZ, Dr. HOLMSTRÖM, Dr. KROZER, Dr. LEMOIGNE, Dr. PANARIS, Dr. PRECHNER, Dr. SCHOLTE, Dr. SERVOTTE, Dr. STRAZIELLE, Dr. UNBEHEND, Dr. VERSCHAVE.

### High Density Polyethylene

The meeting started with a communication from Dr. SERVOTTE dealing with the determination of long-chain branching in high and low density polyethylene (PE). The proposed method was based on a combination of gel permeation chromatography (GPC) and viscometry (VIS). It required measurement of the intrinsic viscosity of the polymer contained in each eluate and calculation of its molecular weight from the GPC chromatogram by means of a universal calibration curve in  $[\eta] \cdot M$ . It was shown that a correction for band spreading was indispensable when silica beads were used as porous material in GPC. The method was applied to linear and branched polyethylene and the results were compared with those obtained by the classical method involving preparative fractionation of the sample. The agreement was proved to be good, at least qualitatively.

The problems posed by a combination of GPC and viscometry were discussed by Prof. BENOIT and Dr. CERVENKA, who presented some theoretical and experimental results in this field, particularly, a Mark-Houwink relation for linear PE in TCB at 135 °C

$$[\eta] = 5.2 \cdot 10^{-4} M^{0.66} \quad (\text{dl/g})$$

Dr. PRECHNER reported about the preparation and characterization of the narrow fractions of linear PE, commercialized by Société Nationale des Pétroles d'Aquitaine (SNPA). Six fractions were prepared by preparative GPC fractionation in two steps. In the first one, the whole polymer was cut into three fractions. In the second one, the two highest fractions were re-fractionated. In each fractionation, the molecular weight range was taken into account and the most efficient set of columns was used. Some results obtained on such fractions by Centre de Recherches sur les Macromolécules (CRM) in Strasbourg and by the Research Centre of SNPA in Lacq are given below:

Fraction	$\bar{M}_n$ (OSM)	$\bar{M}_w$ (LS-CRM)	$\bar{M}_w$ (LS-SNPA)	$\bar{M}_w/\bar{M}_n$ (GPC)	TCB $[\eta]$ 135 °C (dl/g)
1	22 600	32 150	[ 25 800 19 700	1.1	0.604
2		43 600	[ 39 400 40 100	1.8	0.888
3		56 500	[ 54 000 54 200	1.09	1.15
4	102 000	107 200	[ 135 600 132 900	1.12	1.86
5		[ 570 000 506 000	520 000	1.14	4.42
6		700 000	[ 693 000 636 000	1.18	6

The ratio  $\bar{M}_w/\bar{M}_n$  had been calculated from the GPC chromatogram of the fractions. Correction for axial dispersion had been performed, using a

spreading calibration settled by reverse flow. The refractionation of a fraction had confirmed the low value of  $\bar{M}_w/\bar{M}_n$  found by GPC.

On the basis of these results, Dr. PRECHNER presented the following Mark-Houwink relation for linear PE in TCB at 135 °C

$$[\eta] = 7.1 \cdot 10^{-4} M^{0.67} \quad (\text{dl/g})$$

Several other problems were also discussed, including the adsorption of PE on the porous material in GPC, particularly when silica beads were used; the influence of  $dn/dc$  decrease at low molecular weight on the molecular weight distribution obtained by GPC; the problem of NMR detection of long-chain branching; the possible use of turbidimetric detection in GPC.

### Low Density Polyethylene

In the second part of this meeting, results of measurements performed on SNPA fractions of LDPE were presented by

Dr. SCHOLTE (DSM at Geleen):  $\bar{M}_w$  and  $\bar{M}_z$  by equilibrium centrifugation (EC) and intrinsic viscosity in decaline at 135 °C

Dr. SERVOTTE (Solvay et Cie, Brussels):  $\bar{M}_w$  by light scattering (LS) and intrinsic viscosity in TCB at 135 °C

Dr. STRAZIELLE (CRM):  $\bar{M}_n$  by osmometry (OSM)

Dr. PRECHNER (SNPA): Intrinsic viscosity in TCB at 135 °C

Frac- tion	$\bar{M}_n \cdot 10^{-3}$ (OSM)	$\bar{M}_w \cdot 10^{-3}$ (EC)	$\bar{M}_w \cdot 10^{-3}$ (LS)	$\bar{M}_z \cdot 10^{-3}$ (EC)	$[\eta]$ DEC 135	$[\eta]$ TCB 135 (Solvay)	$[\eta]$ TCB 135 (SNPA)
5	232						
7	118						
8			143			1.14	1.18
9		155	104	650	1.16—1.18	0.98	1.05
10		97	72	450	1.05—1.54	0.79	0.88
11	36.7	64	48	620	0.83—0.83	0.69	0.606
12	27.6	43		230	0.67—0.67		0.48
13	18.3		23				0.43
14		23		220	0.37		0.39

These results and the related methods were discussed; particularly, the systematic difference between the weight average molecular weights obtained by equilibrium centrifugation and light scattering could not be cleared up.

A forthcoming programme was decided. Drs. PANARIS and PRECHNER agreed to fractionate 50 g of an LDPE sample and to deliver the fractions before 1 March 1973. The measurements which would be performed in the different laboratories and the amount of each fraction required were as given below

Dr. COUSIN:	GPC	0.2 g
Dr. GLENZ:	LS, OSM, VIS, GPC	1 g
Dr. CROUZET:	VIS, GPC	0.2 g
Dr. SERVOTTE:	LS, VIS, GPC	0.5 g
Dr. VERSCHAVE:	VIS, GPC	0.2 g
Dr. HOLMSTRÖM:	VIS, GPC	0.2 g
Dr. BALL:	OSM, VIS, GPC	0.5 g
Dr. SCHOLTE:	UC (ultracentrifugation)	0.5 g



Moreover, Dr. COUSIN would perform a column fractionation of the same sample. His fractions would also be examined by Dr. HOLMSTRÖM (VIS, GPC) and Dr. SERVOTTE (VIS, GPC). Five g of unfractionated material would be supplied to each laboratory. It was admitted that the measurements of intrinsic viscosity should be carried out in 124 TCB at 135 °C and eventually in a  $\theta$  solvent diphenyl at 115-120 °C.

Assuming that the samples could be delivered by the required date, it was decided that the next meeting would take place at the end of June 1973.

H. HEYNS

## **COMMISSION ON ANALYTICAL NOMENCLATURE (V.3)**

**London, 22 November 1972**

*Present:* Prof. H. M. N. H. IRVING (Chairman), Prof. T. S. WEST (Secretary), Dr. G. BAUDIN, Dr. O. MENIS, Prof. A. J. B. ROBERTSON, Dr. W. I. STEPHEN, Dr. H. ZETTLER (Titular Members); Prof. H. KAISER, Dr. G. F. KIRKBRIGHT, Dr. N. M. RICE, Prof. O. SAMUELSON, Dr. G. SVEHLA (Associate Members); Dr. D. AMBROSE, Dr. A. TOWNSHEND, Dr. H. GRÜNEWALD (Observers); Mr. R. J. M. RATCLIFFE (Assistant Secretary IUPAC).

### **Minutes of Previous Meeting**

The minutes of the meeting held in Washington on 15-18 July 1971 (see *Comptes Rendus XXVI Conference*, pp. 180-183) were approved. There were no matters arising other than those covered by the present agenda.

### **Compendium of Recommended Nomenclature**

The Division Committee had asked that a feasibility report of a compendium of IUPAC recommended analytical nomenclature be prepared by Profs. T. S. WEST and H. FREISER to be discussed at the XXVII IUPAC Conference (Munich, 1973). Prof. WEST felt that this report could be prepared for approval in advance of the Conference. This would allow any subsequent work to be carried out prior to and during the Commission meetings in Munich. The Commission endorsed this view. The attention of all Commissions must be drawn to ensuring compatibility of documents. Where differences occurred, notes explaining these should be added.

### **Contamination Phenomena**

A suggestion that the simpler terms in the tentative version [Tentative Nomenclature Appendix No. 14 (February 1972) to the *Information Bulletin*] be deleted from the definitive report was not accepted. Many of the suggested modifications were accepted and would be incorporated into the final report. In addition, it was agreed to include the table supplied by Prof. R. BELCHER. Subject to inclusion of these minor amendments the Commission approved the report for submission to the Division Committee as definitive nomenclature.

### **Chromatography**

A considerable number of comments were received after publication of the tentative version [TNA No. 15 (February 1972)]. It was agreed that these should be considered in detail by Dr. AMBROSE and Prof. SAMUELSON. Subject

to the condition that this did not involve any major amendment, the Commission approved the report for submission to the Division Committee as definitive nomenclature.

### **Thermal Analysis**

Because only one comment had been received on the tentative proposals [TNA No. 16 (February 1972)] these were adopted as definitive nomenclature to be submitted to the Division Committee for approval.

### **Mass Spectrometry**

Several comments had been received on the tentative recommendations [TNA No. 17 (February 1972)]. After discussion of these comments, agreement was reached on several amendments. The revised manuscript would be submitted to the Division Committee for approval as definitive nomenclature.

### **Scales of Working**

In the light of comments received on the tentative nomenclature [TNA No. 18 (February 1972)], the Commission agreed that further study of page 3 and Fig. 4 was required. An alternative scheme submitted by Prof. KAISER was considered. This, together with the other comments, would be forwarded to Prof. E. B. SANDELL and Dr. MENIS for consideration. A final decision would be made at the XXVII IUPAC Conference as to whether part or all of this document could be approved as definitive nomenclature.

### **Presentation of Analytical Papers for Publication**

After a lengthy discussion the Commission agreed that these documents should be redrafted, referring only to the minimal amount of data that should be incorporated into a paper. There should not be instructions on the establishment of experimental data. Dr. KIRKBRIGHT agreed to prepare revised drafts in tabular form, combining techniques wherever possible. These would be submitted for consideration at the next meeting.

### **Molarity-Normality**

Prof. IRVING tabled new proposals on this subject. Considerable discussion followed with Dr. GRÜNEWALD pointing out the need for recommendations at an early date in view of impending legislation in Germany. Prof. KAISER agreed to publish with such coauthors as necessary, under their own names, a paper on the mole, because the Commission would not be able to prepare its report immediately.

It was agreed that Members would consider the new proposals and send their comments as soon as possible to Prof. IRVING. In particular, it was felt important to define 'Formula amount of substance (mole)' and 'Reacting amount of substance (val)'. This would enable the equivalence factor to be defined as a pure number which should satisfy physicists.

### **Kinetic Methods of Analysis**

No further progress was reported. It was hoped that a draft manuscript would be available from Drs. SVEHLA and TOWNSHEND for discussion at the next meeting.

## **Selectivity Index**

Prof. WEST said that he and Prof. BELCHER of the Commission on Analytical Reactions and Reagents (V.1) had discussed this project extensively. He had set some of his students on drawing up some tables of selectivity indices. It was apparent that a considerable amount of work would have to be done on this topic before simple tables could be produced. Both he and Prof. BELCHER were of the opinion that it might be necessary for a monograph to be prepared on the topic and published independently of IUPAC to set the scene and test the merits of the scheme. They would, however, consider the matter further. The Commission accepted that this was a reasonable proposition and asked to keep the project alive in the IUPAC sense that it would like to receive progress reports. It might be possible once work was sufficiently well advanced to lend the project IUPAC approval, through Commissions V.3 and V.1.

## **Trivial Names**

Prof. IRVING reported that progress was slow and correspondence was continuing with interested parties in *Chemical Abstracts*. A final version should be available in Munich to recommend for publication as tentative nomenclature.

## **Liquid-liquid Extraction**

Following a Conference on Solvent Extraction in 1973, Dr. RICE would submit for consideration in Munich additional proposals to meet the requirements of technology.

## **Criteria for Sensitivity, Detection Limits, Precision, and Accuracy**

It was agreed that there was a need to establish a joint Project Group with the Commission on Spectrochemical and Other Optical Procedures for Analysis (V.4). Representatives from Commission V.3 would be Prof. KAISER and Drs. DOHERTY, MENIS, and ZETTLER. Prof. WEST would contact the Officers of Commission V.4 in order that the project could be started.

## **Ion Selective Electrodes**

The following Project Group was established: Prof. G. G. GUILBAULT (Leader), Dr. N. M. RICE, Dr. R. A. DURST, Dr. J. RŮŽIČKA, Dr. MOMIEM, Prof. H. FREISER. Prof. WEST would write to Prof. GUILBAULT to initiate action and ensure collaboration with the Commission on Electro-analytical Chemistry (V.5).

## **Nomenclature on Data Processing**

It was agreed that Prof. ROBERTSON and Dr. DOHERTY should liaise with the Interdivisional Committee on Machine Documentation in the Chemical Field on this project. Prof. WEST might need to take preliminary steps to activate the project.

T. S. WEST



# MACROMOLECULAR DIVISION WORKING PARTY ON STRUCTURE AND MECHANICAL PROPERTIES OF COMMERCIAL POLYMERS

Frankfurt/Main, 26-27 February 1973

*Present:* Dr. A. J. DE VRIES (Chairman), Dr. M. CARREGA (Secretary), Dr. G. AJROLDI, Dr. A. C. BASKETT, Dr. J. CHAUFFOUREAUX, Dr. M. FLEISSNER, Dr. R. JACOB, Prof. A. S. LODGE, Dr. J. MEISSNER, Dr. H. H. MEYER, Dr. H. MÜNSTEDT, Dr. A. PLOCHOCKI, Dr. W. RETTING, Dr. V. SEMJONOW, Mr. J. L. S. WALES, Dr. H. WILSKI, Dr. J. ZELINGER.

## Meeting held at Bollate, 2-3 May 1972

Arising from the last full meeting of the Working Party, it was confirmed that Dr. T. T. JONES would present a paper at the International Symposium on Macromolecules in Aberdeen (10-14 September 1973) on the 'Orientation in Polymers Programme—Polystyrene'. Several Members regretted that there would be no opportunity to discuss this paper before the next Working Party meeting. Dr. JONES would be asked to send his first draft to all contributors as soon as possible. Solvay et Cie, Badische Anilin- und Soda-Fabrik AG, and Montecatini-Edison SpA had now made available their final results.

The final version of the paper by Mr. A. GONZE and Dr. J. CHAUFFOUREAX, 'A Collaborative Study of the Dynamic, Mechanical, and Impact Properties of PVC—II', had been accepted for publication in *Pure and Applied Chemistry* [scheduled for Vol. 35 (1973)]. This paper would also be presented at the Symposium in Aberdeen.

## Next Meeting

This would be held at Aberdeen in conjunction with the International Symposium on Macromolecules. It would be devoted to the LDPE and PVC rheology programmes and to discussion of the papers on PVC and PS to be presented at the Symposium.

## PVC Rheology Programme

New results in the PVC rheology programme had been distributed by Solvay, BASF, and Rhône-Progil, but unfortunately lack of time did not allow any discussion, which was therefore postponed to the next meeting. A second Progress Report by Mr. WALES would be issued before September 1973.

## General Rules Concerning Organization of the Working Party

Several Members who had recently joined the Working Party asked for more detailed information on its organization. The Secretary would circulate a list of addresses of the Members as well as a list of the laboratories contributing to the various programmes. A list of tentative rules to be discussed at the next meeting would also be prepared and distributed to all Members.

## LDPE Rheology Programme

Dr. MEISSNER presented the first draft of the final version of Part I. The replies to the '13 Still Open Questions' were reviewed. It appeared from discussion that some details were not yet perfectly clear and further infor-

mation was required in order to allow Dr. MEISSNER to complete the final version.

After having received all supplementary information, Dr. MEISSNER would correct the final version of Part I, taking account of the modifications discussed during the meeting, and send it to Prof. LODGE who was willing to correct the English. A decision about publication was postponed to the next meeting.

The first draft of the final version of Part II would be prepared by Dr. MEISSNER, distributed before August 1973, and discussed at the next meeting of the Working Party.

Regarding 'Nonlinear Effects in Cone-and-Plate Rheometers' in the interim report of Part II, written comments should be sent to Dr. MEISSNER before 1 June 1973.

### **Proposals for New Programmes**

Written proposals had been received as follows:

(i) *Tensile Properties of Rigid PVC* (Dr. CHAUFFOUREAUX). Investigation of the rupture behaviour of rigid PVC at low strain rates ( $\dot{\epsilon} < 0.1 \text{ sec}^{-1}$ ) in a temperature range of  $-20$  to  $80^\circ\text{C}$ . Solvay would distribute a detailed programme before 1 May 1973. Members interested in this programme were invited to write to Dr. CHAUFFOUREAUX before 1 June and specify the measurements they were willing to undertake. Samples prepared by Solvay would be distributed before 1 July.

(ii) *Theoretical Treatment of Data Obtained in LDPE Rheology Programme* (Prof. LODGE). The aims of the proposed programme were to extract maximum information from the available data on stated samples in order to construct a molecular theory which could be used to explain the differences in film blowing behaviour. All Members were requested to send to Prof. LODGE comments, suggestions, criticisms or references concerning this programme, which would be executed in the Rheology Research Center in Madison.

During the discussion of Prof. LODGE's proposal the difference in elasticity between HDPE and LDPE was pointed out. According to Dr. FLEISSNER the elasticity in HDPE was strongly influenced by the presence of a high molecular weight tail. A paper on the subject was in press and would be distributed by Dr. FLEISSNER to all Members as soon as available.

(iii) *Melt Rheology of A—B and A—B—A Block-copolymers in Steady-shear and Forced Oscillations* (Dr. MEYER). Several Members were interested in contributing to such a programme. As supplier of commercial samples Shell or Phillips was suggested. It was decided that Dr. DE VRIES should start to contact Shell before any further action concerning this proposal would be undertaken.

(iv) *Melt Rheology of Industrially Important Binary Blends of Polymers* (Dr. PLOCHOCKI). Although the industrial importance of such a programme was acknowledged by several Members, it seemed difficult to obtain well defined samples of commercial polymer blends, particularly in the case of polyolefins. Members were invited to send their suggestions and comments on this proposal to Dr. PLOCHOCKI.

(v) *Extrudate Swelling in Capillary Flow of Industrially Important Polymers* (Dr. PLOCHOCKI). The discussion of this proposal, which was of particular interest for the processing of polyolefins, was postponed until completion of the present LDPE rheology programme.

(vi) *Melt Rheology of Linear Polyethylene* (Prof. G. V. VINOGRADOV). At the informal meeting in Lyon (see this Bulletin, page 32), Prof. VINOGRADOV had been invited to propose a detailed programme. Such a detailed proposal had not yet been received and discussion of a new HDPE programme was, therefore, postponed until a future meeting at which detailed proposals written either by Prof. VINOGRADOV or other Members were available. Proposals to be discussed at the next meeting would have to be distributed to all Members before 1 August 1973.

(vii) *Relationship between Structure and Mechanical Properties of ABS Polymers* (Dr. J. ZELINGER). It was generally agreed that a programme on the relationship between structure and properties of two-phase systems would be an appropriate objective for the Working Party, but several Members expressed the opinion that such a programme should be linked to the programme on the influence of orientation. It was decided, therefore, that a detailed programme should be worked out by Drs. ZELINGER and RETTING as an extension of the present programme on orientation in polystyrene.

M. CARREGA



# REPORTS OF IUPAC-SPONSORED SYMPOSIA

## III NATIONAL CONFERENCE OF PURE AND APPLIED PHYSICAL CHEMISTRY

Bucharest, 4-7 September 1972

The Conference was sponsored by the Romanian Ministry of Education and IUPAC and was organized by the Centre of Physical Chemistry of Bucharest. In addition to 366 Romanian scientists working in research, education, and industry, the Conference was also attended by 53 foreign participants from 13 countries. Some 347 original contributions were delivered in the following seven sections:

1. Quantum chemistry; theory of the chemical bond; molecular structure; reactivity
2. State of matter; transport phenomena; colloids; chemical kinetics; photochemistry; radiochemistry
3. Chemisorption; homogeneous and heterogeneous catalysis; catalytic reactions
4. Chemical thermodynamics; thermochemistry; statistical thermodynamics; thermodynamics of metallurgical processes; thermodynamics of irreversible processes
5. Electrochemistry; solutions of electrolytes; ionic liquids (molten salts); electrode processes; electrometallurgy; corrosion and anticorrosion protection
6. Chemical engineering; mass and heat transfer; effect of surface phenomena; kinetics of unit processes; modelling, optimization, and automation of processes in chemical industry
7. Physicochemical analysis; automation of physicochemical analysis and control

A volume containing the abstracts of the communications was published and distributed among participants.

Opening the Conference, the Chairman of the Organizing Committee, Prof. I. G. MURGULESCU, pointed out the value of physical chemistry research for modern chemistry and chemical industry, as well as its role in teaching chemistry.

Plenary lectures were given by:

M. FLORESCU (Romania)	Applications and Modern Trends of Chromatography in Research and Chemical Industry
W. GROTH (GFR)	Photochemically Generated Radicals in Excited States
A. B. NALBANDYAN (USSR)	New Ways of Studying Slow Gaseous Radical Reactions by EPR
H. H. EMMONS (GDR)	Properties and Structure of Molten Salts with Unsymmetrical Charges: $\text{Me}^{11}\text{Cl}_2\text{—Me}^1\text{Cl}$ Mixtures

A round table discussion was held with the contribution of specialists from various fields of physical chemistry, on the role of basic research and its relationship with development and industry, as well as appreciating the main results of the Conference.

V. EM. SAHINI

## INTERNATIONAL CONFERENCE ON MOLECULAR SPECTROSCOPY

**Wrocław, 15-19 September 1972**

The Conference was held at University of Wrocław under the auspices of IUPAC and sponsored by the Polish Academy of Sciences and the Ministry of Science, Higher Education, and Technology of the Polish People's Republic.

About 420 scientists participated from the following 25 countries: Austria, Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, Finland, France, GDR, GFR, Hungary, India, Italy, Japan, Malaysia, Netherlands, Norway, Poland, South Africa, Sweden, Switzerland, UK, USA, USSR, Yugoslavia.

Some 210 papers were presented: 2 were plenary, 33 invited, and 175 contributed. Because of the large number of papers it was necessary to hold five parallel sessions on the following topics:

1. New theoretical approaches and new experimental methods
2. Molecular excitons, molecular excited states, application of quantum chemical methods to vibrational problems, normal coordinate analysis
3. Spectroscopy and structure of inorganic molecules and coordination compounds
4. Spectroscopy and structure of organic molecules
5. Spectral characteristics, intermolecular interactions, vibrational spectroscopy of solids

An innovation at the Conference was the presentation of some papers (101) in discussion groups under the guidance of discussion leaders. This was made in the hope that the organized discussion on selected topics between scientists gathered together from different laboratories and working in the same fields would stimulate further progress. The following discussion groups were formed: Molecular excitons; Molecular excited states; Spectroscopy of diatomic molecules; Force constant calculations from vibrational frequencies; IR studies of clathrates; Vibrational spectra of oxygen-bond compounds; Electronic spectroscopy of inorganic compounds containing *d*-electron elements; Electronic spectroscopy of inorganic compounds containing *f*-electron elements; ESR studies of copper complexes; Isomerism and tautomerism of organic compounds; Conformation studies by NMR; Application of rare earth complexes in NMR studies; Correlation between spectral and structural parameters of organic compounds; Spectroscopic studies of adsorbed molecules; IR studies of hydrogen-bonded systems;

Proton-transfer effect in the hydrogen bond; Influence of hydrogen bond on molecular structure; Lattice vibrations.

The welcoming addresses at the opening of the Conference were given by its Chairman, Prof. B. JEŻOWSKA-TRZEBIATOWSKA, by the President of the Polish Academy of Sciences, Prof. W. TRZEBIATOWSKI, and by the delegate of the Ministry of Science, Higher Education, and Technology of Poland, Prof. W. JAROMINEK. Prof. N. SHEPPARD greeted the participants in the name of IUPAC. The opening lectures were given by Prof. SHEPPARD on 'Recent Advances in the Infrared and Raman Spectra of Adsorbed Molecules' and by Prof. Y. MORINO on 'Application of Microwave Spectroscopic Techniques to the Detection of Transient Species and to the Study of Reaction Mechanism'.

In addition, the following lectures were delivered by specially invited speakers:

H. J. BERNSTEIN (Canada)	Resonance Raman Spectra
D. BETTERIDGE (UK)	Photoelectron Spectroscopy
P. J. BEYNON (UK)	Fourier Transform NMR
N. A. BORISEVICH (USSR)	Spectroscopy of Complex Molecules in the Gas Phase
S. BRATOS (France)	Infrared and Raman Spectra of Liquids
M. O. BULANIN (USSR)	Infrared Spectroscopy of Liquefied Gases
M. DAVIES (UK)	Dielectric Spectroscopy
R. N. JONES (Canada)	Problems in Infrared Photometry
W. KOŁOS (Poland)	<i>Ab initio</i> Potential Energy Curves
H. LEFEBVRE-BRION (France)	Calculations on Rydberg States of Some Diatomic Molecules
E. A. C. LÖCKEN (Switzerland)	Nuclear Quadrupole Resonance
J. RASSING (Denmark)	Ultrasonic Spectrometry
C. SANDORFY (Canada)	Chemical Spectroscopy in the Vacuum Ultraviolet
C. SCHÄFFER (Denmark)	Phase-fixed $3-I'$ Symbols and Coupling Coefficients for Point Groups
H. S. TAYLOR (USA)	Application of Field Theory Techniques to Computations and Understanding of Atomic and Molecular Properties
I. A. ZAKHAROVA (USSR)	ESCA Spectroscopy
T. M. DUNN (USA)	Spectra of Diatomic Molecules containing Transition Metal Elements
I. KOVACS (Hungary)	Centrifugal Distortions and Multiplet Structure
O. SINANOĞLU (USA)	Molecular Excited States and Potential Surfaces and Many Electron Nonclosed Shell Theory
A. WITKOWSKI (Poland)	Vibronic Coupling in Molecules and Molecular Crystals
A. BARTECKI (Poland)	Influence of Sulphur Atoms on Electronic Transitions in Some Chemical Compounds



W. P. GRIFFITH (UK)	Vibrational Spectra of Nitrido Complexes
W. A. GUILLORY (USA)	Structure, Bonding, and Photochemistry of Some Germanium Free Radicals
J. B. GRUBER (USA)	Multi-Photon Processes and Energy Exchange Mechanism involving Rare Earth and Actinide Ions in Molecular Crystals
B. JEŹOWSKA-TRZEBIATOWSKA (Poland)	Infrared Spectroscopy of Oxygen-Bond Systems
L. SACCONI and J. BERTINI (Italy)	Proton Magnetic Resonance Spectra of Paramagnetic Molecules
W. J. ORVILLE-THOMAS (UK)	Rotational Isomerism and Polar Nature of Chemical Bonds
S. P. SINHA (Malaysia)	Application of Rare Earth Complexes as NMR-Shift Reagent in Illucidating Structure of Organic Molecules
E. WYN-JONES (UK)	Conformational Analysis Using Ultrasonic Relaxation Spectrometry
Z. KĘCKI (Poland)	Solvation of Molecules and Ions as Studied by NMR and Vibrational Spectroscopy
E. R. LIPPINCOTT (USA)	Vibronic Effects in Hydrogen Bonding
C. N. R. RAO (India)	Interaction of $\text{Li}^+$ with Electron Donor Solvents and Vibrational Spectra of Alkali Metal Ion Solvent Cages and Glasses
H. RATAJCZAK (Poland)	Charge Transfer Theory and Vibrational Problems of Hydrogen-Bonded Systems

Most of the invited lectures and other papers presented will be published in a special volume of *Journal of Molecular Structure*.

Scientific aspects of the activities were supplemented by a comprehensive attractive social programme. During the Conference an exhibition of spectroscopic apparatus was organized, where companies such as JEOL (Japan), Perkin-Elmer (Austria), and Pye-Unicam (UK), exhibited their products.

H. RATAJCZAK

## **FORTHCOMING IUPAC-SPONSORED SYMPOSIA**

### **INTERNATIONAL CONFERENCE ON PROGRESS AND FUTURE OF MACROMOLECULAR SCIENCE**

**High Tatras, Štrbské Pleso, 15-17 May 1973**

The Conference will deal with the following topics:

- New Trends in Synthesis and Transformations of Macromolecules
- New Properties and Functions of Macromolecules and their Systems
- New Methods of Investigation of Macromolecular Systems

#### **Main Lectures**

The main lectures have kindly been promised by:

- |                                   |  |
|-----------------------------------|--|
| K. A. ANDRIANOV (USSR)            | Development of Scientific Studies of Polymers with Inorganic Molecules in the Chain            |
| H. BENOIT (France)                | New Problems in Interpretation of Thermodynamic Properties of Dilute Solutions                 |
| G. M. BURNETT (UK)                | (title not given)  |
| S. CLAEISSON (Sweden)             | Effects of High Pressure on Macromolecular Solutions   |
| A. B. DOLGOPLOSK (USSR)           | Progress in Stereospecific Catalysis and Synthesis of High-elastic Rubber                      |
| J. FURUKAWA (Japan)               | Alternating Copolymers   |
| V. A. KABANOV (USSR)              | The Problem of Artificial Enzymes  |
| V. V. KORSHAK (USSR)              | Some Problems of Polymer Synthesis by Polycondensation Reactions                               |
| H. F. MARKS and S. M. ATLAS (USA) | Progress in Polymer Characterization   |
| M. KRYSZEWSKI (Poland)            | New Methods of Investigating Relationships between Electrical Properties and Polymer Structure |
| C. G. OVERBERGER (USA)            | Macromolecules as Reactants in Organic Reactions   |
| B. PHILIP (GDR)                   | Chemical Transformation and Super Molecular Structure of Polymers                              |
| G. SMETS (Belgium)                | Synthesis of Some New Polyampholytes and their Properties                                      |
| M. SZWARC (USA)                   | Block and Graft Polymers and their Future Applications   |
| F. TÜDÖS (Hungary)                | The Future of Radical Polymerization   |

The main lectures will not be published by the Organizing Committee. Short Communications will not be presented at the Conference.

#### **Discussions**

The aim of the Conference is to promote an exchange of views on the present state and development of macromolecular science in both the near and distant future. Attention will be drawn primarily to problems, the solution of which might lead not only to the progress of macromolecular science itself but, moreover, to major advances in medicine, technology, and the like. There-

fore, enough time will be devoted to discussions on the main topics of the Conference.

### **Conference Languages**

The official Conference languages are English and Russian. Translation will be provided.

### **Secretariat**

All correspondence concerning the Conference should be addressed to:

Secretariat, IUPAC Conference on Progress  
and Future of Macromolecular Science  
Polymer Institute  
Slovak Academy of Sciences  
Dúbravská cesta  
809 34 Bratislava  
Czechoslovakia

## **XI EUROPEAN CONGRESS ON MOLECULAR SPECTROSCOPY**

**Tallinn, 28 May-1 June 1973**

The Congress is being organized by the Academy of Sciences of USSR and Academy of Sciences of Estonian SSR under the sponsorship of IUPAC and the European Physical Society.

### **Scope**

1. *Optical spectroscopy of molecular crystals.* Theoretical and experimental studies on the spectral features of molecular crystals. New techniques for studying the energy spectra of singlet and triplet excitons and their kinetics, exciton-phonon interaction, behaviour of impurities, properties of molecular crystals under conditions of high excitation density.
2. *Impurity molecules and molecular aspects of point defects in ionic crystals.* Spectroscopic studies of molecular impurity centres and the associated relaxation effects. Relaxation effects in a system of anisotropic centres, electrocaloric and similar effects. The lattice dynamics near complex and molecular defects. The physics of complicated impurity centres and colour centres. Formation of quasimolecular systems in a crystal ( $V_K$ -centres).
3. *Matrix spectroscopy of molecules, the Shpol'sky effect.* Spectroscopy of the molecules introduced into various crystalline and glassy matrices.
4. *Intra- and intermolecular energy transfer.* Theoretical and experimental spectroscopic studies of intra- and intermolecular transformations and transfer of electron excitation energy in complex organic molecules. Investigations by electronic spectroscopy of the kinetics and the relaxation mechanism of electronic states, and of the degradation of electronic excitation energy (excluding the transfer and transformation of vibrational and rotational energy).
5. *Fourier transform techniques and pulse methods in NMR.* New pulse and Fourier transform methods for the study of high resolution NMR spectra and relaxation times of nuclei other than  $^1\text{H}$  and  $^{19}\text{F}$  in organic liquids, bio-



polymers, and solids. Chemical shifts and nuclear relaxation of all magnetic nuclei in large molecules of organic compounds and in biopolymers.

6. *Heteronuclear magnetic resonance of liquids*. High resolution NMR spectra of all nuclei other than  $^1\text{H}$  and  $^{19}\text{F}$ . Theory, measurement, and applications of chemical shifts, spin-spin coupling constants, and relaxation parameters of these nuclei. Study of the structure and conformation of molecules, internal rotation, chemical polarization, mechanisms and kinetics of chemical reactions by heteronuclear resonance techniques.

### **Programme**

The programme of the Congress will include both invited review papers and short communications on original research. Not all of the contributed papers will be delivered, but they will be published as abstracts for discussion. Papers of general interest will be included in the programme of the plenary sessions. The rest of the papers will be presented in three parallel sessions. All the sessions will take place in the lecture rooms of the Tallinn Polytechnical Institute.

Papers may be presented in any language, but the Organizing Committee expects that authors will use a language that is widely understood by the participants. Simultaneous translation from Russian into English and vice versa will be provided.

The invited papers will be published subsequently in the IUPAC journal *Pure and Applied Chemistry*.

### **Accommodation, Travel, and Visa Arrangements**

These services for Congress participants are being provided by Intourist, the USSR foreign travel agency. If there is no Intourist office in your country, you should apply to the Intourist Partner-Agencies in the country which is most convenient for you, e.g., a country through which you would travel on your way to USSR. Arrangements for participants from socialist countries are regulated by appropriate agreements with these countries.

### **Secretariat**

All correspondence should be addressed to:

Dr. T. SALUVERE  
Organizing Committee of XI ECMS  
Institute of Cybernetics  
Academy of Sciences of ESSR  
Lenini puistee 10  
Tallinn 200001  
USSR

Phone numbers: 605729, 40640  
Telex: Tallinn 1114

## **XV INTERNATIONAL CONFERENCE ON COORDINATION CHEMISTRY**

**Moscow, 25-30 June 1973**

The Congress is being organized by the Academy of Sciences of USSR and the Lomonosov Moscow State University under the sponsorship of IUPAC.

## Programme

The subjects to be treated are grouped in the following sections:

- (i) Structure and Bonding in Coordination Compounds: Theory and Experimental Data
- (ii) Spectroscopy of Coordinating Compounds
- (iii) Synthesis of New Types of Coordination Compound
- (iv) Thermodynamics, Kinetics, and Mechanisms of Complex Formation
- (v) Catalysis with Coordination Compounds
- (vi) Complex Formation in Nonaqueous Solutions and Gaseous Phase

## Plenary and Section Lectures

The Organizing Committee has invited the following scientists to deliver plenary lectures:

N. M. ZHAVORONKOW (USSR)	Scientific Heritage of L. A. Chugaev
S. A. SHCHUKAREV (USSR)	Reminiscences of L. A. Chugaev
J. C. BAILAR, Jr. (USA)	Some Aspects of Scientific Activity of L. A. Chugaev
L. BAKER (USA)	New Studies in the Field of Heteropolycompounds
G. WILKE (GFR)	Olefin Transformations by Action of Coordination Compounds
J. GAŽO (Czechoslovakia)	Structure and Properties of Some Copper(II) Coordination Compounds
<u>M. E. DYATKINA</u> , N. M. KLIMENKO and E. L. ROSENBERG (USSR)	Modern Aspects of Quantum Chemical Calculations of Coordination Compounds
B. JEŹOWSKA-TRZEBIATOWSKA (Poland)	New Complex Compounds with Bridging Oxygen Atoms
L. CATTALINI (Italy)	Kinetics and Mechanisms of Reactions of Coordination Compounds of Noble Metals
V. I. SPITSYN (USSR)	Action of Ionizing Radiation on Coordination Compounds
D. STRANKS (Australia)	Relaxation Methods in Study of Kinetics and Mechanisms of Coordination Compounds at High Pressures
K. B. YATSIMIRSKII (USSR)	Ligand Mutual Influence in Coordination Compounds

Besides these plenary lectures about 30 section lectures will be delivered at the meetings of the six sections. The plenary lectures will be published in the IUPAC journal *Pure and Applied Chemistry*.

## Scientific Sessions

The official working languages of the Conference are Russian and English. Abstracts of the papers submitted will be published both in Russian and English. Because the time of the Conference is limited some papers will only be accepted by the Programme Committee for publication in the volume of abstracts.

The Opening Ceremony of the Conference will take place at the Kremlin Palace of Congresses. The first plenary session will be devoted to L. A. CHUGAEV's centenary, founder of coordination chemistry in USSR, initiator of an outstanding school of coordination compound chemists in his country. At this session foreign and Soviet scientists will deliver lectures on the scientific heritage of L. A. CHUGAEV and development of his ideas at the present time.

The scientific sessions of the Conference will be held in the Chemistry Department of the Lomonosov Moscow State University in the Lenin Hills. The plenary sessions will be held in the Assembly Hall of the main building of the University.

### **Accommodation, Travel, and Visa Arrangements**

These services may be arranged through Intourist (see this Bulletin, page 65).

### **Secretariat**

All correspondence should be sent to:

Organizing Committee of XV ICC  
Room 350, Chemistry Department  
Lomonosov Moscow State University  
Moscow 117234, USSR  
Telephone: 139-24-69

## **IV CANADIAN WOOD CHEMISTRY SYMPOSIUM**

### **Quebec, 4-6 July 1973**

The Symposium will be held at Chateau Frontenac, Quebec, under the joint sponsorship of the Chemical Institute of Canada and the Technical Section of CPPA, with the international sponsorship of IUPAC.

The programme includes invited and selected papers in the following fields:

- (i) Conformation of Macromolecules in Wood
- (ii) New Approaches to Pulping and Bleaching Processes
- (iii) Cellulose-Polymer Combinations

The Keynote Speakers are:

R. D. PRESTON (UK)	Conformational Problems in Wood Structure
N. HARTLER (Sweden)	New Approaches to Chemical Pulping and Bleaching, with Special Reference to Methods which may Reduce Pollution Loads
J. W. S. HEARLE (UK)	Combine to Serve: Use of Cellulose-Polymer Systems in Textiles

Applications for registration should be sent to:

Mr. T. H. G. MICHAEL  
Chemical Institute of Canada  
Suite 906, 151 Slater Street  
Ottawa, Ontario K1P 5H3  
Canada



# VI INTERNATIONAL CONFERENCE ON ORGANOMETALLIC CHEMISTRY

Amherst, Massachusetts, 13-17 August 1973

The Conference will take place at the University of Massachusetts. All technical sessions will be held in the new Murray D. Lincoln Campus Center. Participants are encouraged to stay in the housing accommodation at the Campus Center.

## Scientific Programme

The scientific programme of the Conference will consist of 14 invited plenary lectures, as well as approximately 160-170 contributed papers. The plenary lectures will be scheduled in the large Campus Center Auditorium so that all active participants and student participants may attend.

The number of contributed papers, representing all aspects of pure and applied organometallic chemistry, seems likely to be too large for convenient and efficient oral presentation. A selection of contributed papers will be made, if necessary, by the Organizing Committee and the International Advisory Committee on the basis of information in the submitted abstract.

## Plenary Lectures

- |                            |   |
|----------------------------|---|
| H. H. BRINZINGER (USA)     | Reactivity Parameters in Electron-deficient Sandwich Compounds                              |
| H. BRUNNER (Germany)       | Optically Active Organometallic Compounds   |
| M. R. CHURCHILL (USA)      | Recent Results from Diffraction Studies on Organo-Transition Metal Complexes                |
| J. P. COLLMAN (USA)        | Disodium Iron Tetracarbonylferrate: A Transition Metal Analogue of the Grignard Reagent     |
| F. A. COTTON (USA)         | Some Recent Work on Stereochemically Non-rigid Organometal Carbonyl Compounds               |
| H. FELKIN (France)         | Some Reactions involving Nickel Complexes   |
| L. MARKÓ (Hungary)         | Cobalt and Rhodium Carbonyls in Organic Chemistry   |
| A. N. NESMEYANOV (USSR)    | Organometallic Derivatives of Metallocenes and Cyclopentadienyl-Metal Carbonyls             |
| J. G. NOLTES (Netherlands) | Aspects of the Chemistry of Polynuclear Aryl-copper and Arylsilver Compounds                |
| H. SCHMIDBAUR (Germany)    | Organometallic Onium Salts and Ylides   |
| P. L. TIMMS (UK)           | Direct Preparation of Organometallic Compounds from Atoms or Small Molecules                |
| YU. A. USTYNUK (USSR)      | Metallotropism in Metallomonohaptocyclopentadienyls   |
| J. WOOD (USA)              | Biochemical and Environmental Significance of Cobalamin Dependent Methyl Transfer to Metals |
| A. YAMAMOTO (Japan)        | Reactivities and Catalytic Activities of Transition Metal Alkyls and Hydrides               |

## Language

The official language of the Conference is English. All Abstracts will be

published in English. Papers may be presented orally in any language, but the Organizing Committee strongly recommends that speakers use English if at all possible. Simultaneous translation facilities will not be available.

Abstracts of papers will be published as a bound volume which will be available to all active and student participants, and to others who cannot attend the Conference at a nominal charge.

### **Secretariat**

All correspondence should be sent to:

SYLVIA A. GARDNER, Secretary  
VI International Conference on Organometallic Chemistry  
Department of Chemistry  
University of Massachusetts  
Amherst  
Massachusetts 01002, USA

### **INTERNATIONAL SYMPOSIUM ON MICROCHEMICAL TECHNIQUES—1973**

**University Park, Pennsylvania, 19-24 August 1973**

This Symposium is being conducted by the Pennsylvania State University through its College of Science. It is being organized by the American Microchemical Society with the sponsorship of the Commission on Microchemical Techniques, IUPAC Division of Analytical Chemistry.

### **Purpose**

The Symposium will provide for an interchange of information and ideas among technologists from all parts of the world concerning new methods and techniques or unique applications in the field of microchemistry. It will take place in the informal atmosphere of fellowship and individual contact made possible by the excellent on-campus accommodations and facilities of the Pennsylvania State University.

### **Technical Programme**

The technical programme will consist of sessions dedicated to topics of current interest, general papers, discussion groups, and an evening session on 'The Art of Presenting a Paper'. The dedicated special sessions will include the following topics:

*Automated Elemental Analyzers: Ten Years Later.* A critical and objective evaluation of the impact of the several automatic elemental analyzers which are currently commercially available will be presented by a group of well-known, qualified workers in the field, led by D. KETCHUM (Rochester). The critique will include the following instruments: Perkin-Elmer Model 240 Carbon, Hydrogen, and Nitrogen Analyzer; Hewlett-Packard Model 185 Carbon, Hydrogen, and Nitrogen Analyzer; Carlo-Erba Model 1102 Carbon, Hydrogen, and Nitrogen Analyzer; Hereaus Automatic Dumas Nitrogen Analyzer.

*Computerization of the Perkin-Elmer 240 Carbon, Hydrogen, Nitrogen, and Oxygen Analyzer.* The use of modern electronic computers to enhance the operation of the Perkin-Elmer 240 Analyzer will be described. R. CULMO (Norwalk), R. KUBLER (Basel), G. MACIAK (Indianapolis), E. OLSON (Kala-

mazoo), and D. HARRINGTON (Painesville) will discuss their experiences in the application of computer devices to elemental analyzers. The pitfalls and failures, as well as the advantages to be gained, will be emphasized.

*Computers in the Laboratory.* The application and integration of computers into routine laboratory operations will be discussed. Several speakers will attempt to answer the questions of: What equipment is available? What will it cost? How does one insure that measurements originating from different techniques and in differing dimensions can be made available, in a usable format, to the research chemist when and where he needs it? The administration and interpretation of spectra originating from all types of spectrophotometry will be discussed by T. CLERC (Zürich). The use of computers in performing and interpreting titrimetric experiments will be discussed by D. JAGNAR (Göteborg), and several other papers will discuss the hardware, installation, and administration of a computerized laboratory.

*Organic Elemental Analysis: New Methods and Equipment.* In the past few years, a number of new instruments and methods have been devised for the automatic determination of the elements commonly occurring in organic materials. Methods and equipment for determination in the microgram, as well as the milligram, range will be discussed by W. MERZ (Ludwigshafen/Rhein), B. GRIEPINK (Utrecht), A. DIRSCHERL (Basel), F. SCHEIDL (Nutley), *et al.*

*Forensic Analysis: Narcotics and Drugs of Abuse.* A panel of speakers, led by H. BRANDENBERGER (Zürich), will discuss the problems of detection and control of narcotics and drugs of abuse. Starting with a paper on the pharmacological description of these substances and their effect on the human body by D. JENDEN (Los Angeles), the session will include the analytical methods used in different levels of detection and control.

*Environmental Analysis.* The application of microtechniques to the determination of deleterious materials in the atmosphere, potable water supplies, and in industrial effluents, will be presented in papers by a number of workers.

*Microelectrodes.* W. SIMON (Zürich), *et al.*, will present a discussion of the theory and application of microelectrodes to measurements of ion activity in various systems.

*Organic Functional Group Analysis: New Directions.* The current status and direction of functional group analysis will be reviewed by D. ANDERSON (Edinburgh), S. SIGGIA (Amherst), J. ŽYKA (Prague), *et al.*

Also included in the programme will be sessions on the topics of: Electro-analytical Advances, Ion-selective Electrodes, Microscale Separations, Standards and Standardization for Microchemistry and Microanalysis, in which will be included the evaluation of the 'do it yourself' kits now available for clinical testing, Trace Analysis, Applications of Thermal Methods of Analysis, New Techniques in Microchemistry, and Sample Handling Techniques.

A special evening programme will be presented on the topic of How to Present a Scientific Paper. The effective presentation of scientific information, both orally and by graphic media, will be discussed by several experts in the field. D. HICKS (Rochester) will present, in an illustrated lecture, the proper preparation and presentation of information with the use of visual aids. W. DREEZEN (Ames) will discuss the organization and preparation of the information into a form suitable for mechanical reproduction and distribution. R. A. CHALMERS (Aberdeen) will discuss the problem of scientific communication from the standpoint of the author, the referee, and that of



the editor of a learned journal. W. FRENCH (Rochester) will discuss the legal obligations and aspects of publication.

### **Commercial Exhibition**

Commercial exhibits will be open Monday evening, 20 August, and Tuesday, 21 August, through Thursday, 23 August, in the East Halls Housing Complex. The exhibition will feature equipment, apparatus specialities, and chemicals of microchemical and microanalytical interest.

### **Miscellaneous Information**

In mid-August, day temperatures at University Park may reach 81°F (27°C) with a relative humidity up to 75%, and evening temperatures may go as low as 59°F (15°C).

Inquiries about the technical programme should be directed to:

HOWARD J. FRANCIS, Jr.  
Pennwalt Corpn.  
900 First Avenue  
King of Prussia, Pennsylvania 19406, USA

Inquiries about the commercial exhibition should be directed to:

RALPH G. LADE  
Rohm & Haas Co.  
POB 219  
Bristol, Pennsylvania 19007, USA

Inquiries concerning local arrangements, registration, and housing should be directed to:

KENT R. ADDIS  
J. Orvis Keller Building  
Pennsylvania State University  
University Park, Pennsylvania 16802, USA

## **1973 PRAGUE MICROSYPOMOSIA ON MACROMOLECULES**

### **XII MICROSYPOMOSIUM: ORGANIZED STRUCTURES IN POLYMER SOLUTIONS AND GELS**

**20-23 August 1973**

#### **Topics**

- (1) Intramolecular ordering phenomena
- (2) Intermolecular ordering phenomena in solutions and gels
- (3) Nucleation phenomena in solutions
- (4) Ordering phenomena of the liquid-crystal type
- (5) Complex formation in solutions and gels

#### **Objective**

The Microsymposium will be devoted to the ordering effects observed in solutions and gels of synthetic and natural polymers under equilibrium and nonequilibrium conditions. The results obtained by thermodynamic, hydro-

dynamic, optical, rheological, rheoptical, mechanical, NMR, and other methods will be the subject of main lectures, short communications, and special discussion sessions. Topic (1) concerns organized structures inducing specific functions, further intramolecular association, segregation, *etc.* By intermolecular ordering phenomena—*cf.* Topic (2)—association, micelle formation, gel formation (*e.g.*, by external fields) and similar processes are to be understood. Papers dealing with the morphology of polymer crystals will only fulfil the aim of the Microsymposium if they contribute to the characterization of the precrystalline state of solution—*cf.* Topic (3). Communications pertaining to Topic (4) should deal primarily with macromolecules; from the low-molecular-weight liquid crystals only those will be discussed which are of importance for investigation of macromolecular systems. Topic (5) refers to the interaction of complementary macromolecules, macromolecular matrices, complex formation with low-molecular-weight substances, *etc.* The Microsymposium will be a forum for exchanging experience and ideas on the topics mentioned, for arriving at a better understanding of their molecular nature, for unveiling common features and, if possible, for establishing a basis for a synthetic view.

### **XIII MICROSYMPOSIUM: TRANSFORMATIONS OF FUNCTIONAL GROUPS ON POLYMERS**

**27-30 August 1973**

#### **Topics**

- (1) Polymer structures and reactivity of their functional groups
- (2) Modelling of polymer transformations
- (3) Macromolecular carriers of special functions for medical application
- (4) Macromolecular carriers of special functions for technical applications
- (5) Modifications of biopolymers with functional groups

#### **Objective**

This Microsymposium should contribute to the exchange of ideas and experience in the chemistry of polymer transformations and their relations to polymer structure. At the same time, the chemical and physical bases for technical and medical applications of modified polymers are intended to be elucidated. The contributions will be explicitly concentrated on chemical transformations occurring without any changes in the degree of polymerization; this means that such problems as skeletal degradation, crosslinking, grafting, end group reactions, *etc.*, are excluded. Modelling at various degrees of structural similarity is one of the ways leading to the separation of the organic chemical effects (in the closest vicinity of the reaction centre) from the specific effects of the polymer structure. Homogeneous and heterogeneous polymer reaction systems, transformations in swollen gels, in amorphous and crystalline polymers, as well as homogeneous and heterogeneous transformations (*i.e.*, reactions taking place at a number of sites or preferably in certain regions of the polymer system) are regarded as the desirable discussion topics. Only specific features of polymer transformations connected with technical and medical applications of modified polymers and their systems (ion exchangers, membranes, sorbents, catalysts, fixed enzymes, biomedical materials, *etc.*) will be discussed. Investigations of the transformations of biopolymers can stimulate their new technical and medical application.

## Scientific Sessions of Microsymposia

These will consist of invited lectures, short communications, and discussions. About eight or nine invited lectures will be presented at each Microsymposium and then published in the IUPAC journal *Pure and Applied Chemistry*. Special sessions will be devoted to the discussion of main lectures and Microsymposium subjects. Short communications will be discussed immediately after their presentation. Arrangements are being made, where required, for publication of these papers in *Journal of Polymer Science, Part C*.

English is preferred for all Microsymposium contributions and publications. For Russian-speaking participants the necessary interpreting will be provided during discussions. All sessions will be held in the Institute of Macromolecular Chemistry of the Czechoslovak Academy of Sciences.

## Microsymposia Secretariat

All enquiries should be directed for the attention of:

PMM Secretariat  
c/o Institute of Macromolecular Chemistry  
Czechoslovak Academy of Sciences  
Petržiny 1888, Praha 616  
Czechoslovakia

## SYMPOSIUM ON CONTRIBUTION OF CHEMISTRY TO FOOD SUPPLIES

**Hamburg, 29-31 August 1973**

The Symposium, organized jointly by the Food Section (acting on behalf of the Applied Chemistry Division) of IUPAC and IUFoST in conjunction with Gesellschaft Deutsche Chemiker, is designed to establish areas of contact and cooperation between the two International Unions in the very important field of food production and supplies. It will present an opportunity to bring together chemists, food scientists, and food technologists, and to focus attention on the contributions which they can bring to each other's disciplines. This is the first time in the history of the two Unions that such an attempt has been made. The speakers have been selected not only for their distinction in their own subjects; many have also made important contributions to international and interdisciplinary understanding of the implications of contemporary research.

## Programme

The Symposium will be held at the Federal Chemical Institute in Hamburg. The programme will be divided into six sessions and include invited lectures and submitted papers.

The following programme details relate to invited papers:

*Wednesday, 29 August*

Opening Session, including paper on *International Science and International Development*

H. EGAN (UK)

IUPAC Programme in Relation to Food Supplies

Session on Chemical Modification of Food



J. W. E. COENEN (Netherlands)	Chemical Modification of Fats
K. HEYNS (Germany)	Chemical Modification of Carbohydrates
M. PYKE (UK)	Synthesis of Proteins
M. G. J. BEETS (Netherlands)	Odour, Taste, and Molecular Structure

*Thursday, 30 August*

Session on Contaminants in Food

J. C. AYRES (USA)	Mycotoxins
E. O. HAENNI and H. FISCHBACH (USA)	Trace Analysis for Polynuclear Aromatic Hydrocarbons in Food
A. E. WASSERMAN (USA)	Trace Nitrosamine Analysis

*Friday, 31 August*

Session on Development and Evaluation of New Proteins

J. HAWTHORN (UK)	New Protein Processes
A. D. ODELL (USA)	Structure by Textile Techniques
T. WATENABE (Japan)	Research and Development of New Plant Protein Foods in Japan
O. B. SMITH (USA)	Structure by Extrusion Cooking
N. S. SCRIMSHAW (USA)	Appraisal of Nutritional Significance of New Proteins
J. McL. PHILP (UK)	Assessing the Safety in Use of New Proteins
W. MANSON (UK)	Chemical Properties of New Proteins in Relation to Structural Possibilities

The invited lectures and a selection of contributed papers will be published in a special Symposium Volume supplement to the IUPAC journal *Pure and Applied Chemistry*. Rapid publication is ensured by offset (lithographic) printing directly from the manuscripts supplied by the authors at the Symposium.

### **Registration, Travel, and Accommodation**

Forms for registration, travel, and any accommodation requirements may be obtained from the Symposium Secretary:

Dr. A. J. COLLINGS  
Unilever Research Laboratory  
Colworth House, Sharnbrook  
Bedfordshire, UK

## **XXIV IUPAC CONGRESS**

**Hamburg, 2-7 September 1973**

The scientific programme will take place in the newly built Hamburg Congress Centre. The plenary and section lectures have been finalized as follows:

### *Section 1 High Polymers*

Plenary lecture—

G. J. SMETS (Belgium)	Some New Polymers, their Syntheses and their Properties
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Section lectures—

1. Kinetics and Mechanism of Polyreactions

- O. F. OLAY (Austria) Main Features of the Kinetics of Polyreactions  
J. P. KENNEDY (USA) Carbenium Ion Polyreactions

2. Structure and Properties of High Polymers

- E. BAER (USA) Structure and Properties of Polymeric Solids under High Pressure  
R. KOSEFELD (Germany) Conformation and (Internal) Flexibility of Macromolecules

3. Thermodynamics of High Polymers

- TH. G. SCHOLTE (Netherlands) Determination of Thermodynamic Quantities of Solutions of High Polymers with the Help of Light Scattering and Equilibrium Ultracentrifugation  
W. H. STOCKMAYER (USA) Some Problems in the Statistical Mechanics of Chain Conformation

4. New Developments

- G. DALL'ASTA (Italy) Synthesis and Transformation of Polymers through Metathesis and Structure of Catalysts for Metathesis  
N. G. GAYLORD (USA) Polymerization of Polymer-induced Comonomer Charge Transfer Complexes  
G. MANECKE (Germany) Some Organic Semiconducting Polymers

5. Inorganic High Polymers

- O. GLEMSER (Germany) Inorganic High Polymers

*Section 2 Chemistry of Organic Natural Products*

Plenary lecture—

- F. SANGER (UK) Sequences in Nucleic Acids

Section lectures—

1. Chemistry of Nucleic Acids and Nucleotides

- H. G. KHORANA (USA) Synthesis of Deoxynucleic Acids  
CH. WEISSMANN (Switzerland) Structure and Function of a Viral RNA  
H. G. ZACHAU (Germany) Structure-Function Relationships in Transfer Ribonucleic Acids

2. Antibiotics and Mycotoxins

- YU. A. OVCHINNIKOV (USSR) Macrocyclic Depsipeptide Antibiotics and Transmembrane Ion Transport  
G. BÜCHI (USA) Chemistry of Some Mycotoxins  
S. SHIBATA (Japan) Anthraquinonoid Mycotoxins

3. Chemistry of Lipids and Prostaglandins

- D. A. VAN DORP (Netherlands) Essential Fatty Acids and Prostaglandins  
L. L. M. VAN DEENEN (Netherlands) Phospholipids

- D. SHAPIRO (Israel) Approaches to the Synthesis of Gangliosides
4. Problems of Nitrogen Fixation
- E. E. VAN TAMELEN (USA) An Organic-inorganic System for Chemical Modification of Molecular Nitrogen under Mild Conditions

### *Section 3 Solid-state Chemistry*

Plenary lecture—

- N. B. HANNAY (USA) Recent Advances in Solid-state Chemistry

Section lectures—

- Elementary Processes of Material Transport involving Inorganic Solids
 

A. B. LIDIARD (UK) Atomic and Ionic Transport in Crystalline Solids

R. L. COBLE (USA) Diffusion Transport in Powder Processing
- Principles of Preparative Solid-state Chemistry
 

J. C. JOUBERT (France) Synthesis of New Dense Phases of Mixed Transition Metal Oxides under High Pressure and High Temperature Conditions

R. F. BREBRICK (USA) Thermodynamics and Preparation of Non-stoichiometric, Nonmetallic Compounds

I. V. TANANAEV (USSR) Synthesis and Properties of Phosphate Materials
- Inorganic Structural Chemistry
 

ST. ANDERSSON (Sweden) Aspects of the Principles of Structure and Synthesis of Oxide or Oxide-like Compounds formed by Transition Elements of Groups IV, V, and VI of the Periodic Table

A. KJEKSHUS (Norway) Current Problems concerning Structural Chemistry of Transition Metal Pnictides and Chalcogenides

E. PARTHÉ (Switzerland) Application of Valence Electron Concentration in Crystal Chemistry

J. PORTIER (France) Crystal Chemistry and Magnetic Properties of Fluorides and Oxyfluorides of 3d Transition Elements

### *Section 4 Compounds of Nonmetals*

Plenary lecture—

- R. SCHAEFFER (USA) Recent Advances in Structural Chemistry of Nonmetals

Section lectures—

- Compounds of Boron and Silicon
 

H. NÖTH (Germany) New Results and Aspects of Boron Chemistry

P. L. TIMMS (UK) Developments in Boron and Silicon Subhalide Chemistry

M. G. VORONKOV (USSR) Advances in Chemistry of Biologically Active Organosilicon Compounds

R. A. BENKESER (USA) Chemical Properties of the Si-H Bond



## 2. Compounds of Phosphorus

- F. H. WESTHEIMER (USA) Mechanisms of Hydrolysis of Phosphates and Related Compounds  
R. F. HUDSON (UK) Reactivity of Heterocyclic Phosphorus Compounds

## 3. Compounds of Sulfur

- O. FOSS (Norway) Aspects of the Structural Chemistry of Polythionates  
F. G. BORDWELL (USA) Sulfur Groupings as Mechanistic Probes

## 4. Compounds of the Halogens

- K. O. CHRISTIE (USA) Halogen Fluorides  
R. J. GILLESPIE (Canada) Halogen Cations

## *Section 5 Applied Electrochemistry*

### Plenary lecture—

- M. FLEISCHMANN (UK) Some Engineering Aspects of Electrosynthesis

### Section lectures—

#### 1. Electrochemical Engineering

- F. GOODRIDGE (UK) Recent Developments in Design of Electrolytic Cells  
N. IBL (Switzerland) Fundamentals of Electrochemical Engineering: Role of Transport Phenomena

#### 2. Electrochemical Energy Conversion

- W. VIELSTICH (Germany) Electrochemical Energy Conversion with the Help of Fuel Cells and Metal-Air Cells  
F. VON STURM (Germany) Electrocatalysts in Power-generating Cells  
L. GIERST (Belgium) Electrochemical Oxygen Ionization: Catalysis and Inhibition

#### 3. Organic and Inorganic Electrochemistry

- F. BECK (Germany) Organic Electrosynthesis in the Capillary Gap Cell  
L. EBERSON (Sweden) Organic Synthesis by Anodic Oxidation: Uses and Limitations  
G. CAUQUIS (France) Why Organic Solvents are so Interesting in Organic and Inorganic Electrochemistry

#### 4. Electrochemical Surface Treatment

- Y. M. KOLOTYRKIN (USSR) Electrochemical Surface Treatment

## *Section 6 Radiochemistry*

### Plenary lecture—

- G. T. SEABORG (USA) Status Report on the Transuranic Elements

### Section lectures—

#### 1. Chemical Technology of Nuclear Fuels

- D. E. FERGUSON (USA) Chemical Reprocessing of Nuclear Fuels

- |                    |                              |
|--------------------|------------------------------|
| W. STOLL (Germany) | Preparation of Fuel Elements |
|--------------------|------------------------------|
2. Transuranic Elements
 

A. GHIORSO (USA)	Studies on the Heaviest Elements at Berkeley
I. ZVARA (USSR)	Studies on the Heaviest Elements at Dubna
V. I. SPITSYN (USSR)	Chemical Research on the Actinide Elements
  3. Modern Trends in Preparation of Radionuclides and Labelled Compounds
 

A. P. WOLF (USA)	Labelling of Compounds with Shortlived Nuclides and their Application
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  4. Nuclear Applications to Technological and Environmental Problems
 

K. LJUNGGREN (Sweden)	Nuclear Applications to Technology
G. B. COOK (Austria)	Nuclear Applications to Environmental Problems

*Section 7 Symposium on Information and Communication in Chemistry*

- |                           |   |
|---------------------------|---|
| L. C. CROSS (UK)          | Primary Literature in the Future                                    |
| A. I. MICHAILOV<br>(USSR) | Means of Communication in Chemistry: Yesterday, Today, and Tomorrow |

In addition to the above general scientific programme of the Congress, the following joint symposia will be held (only the main lectures are shown):

1. *Polypeptide Hormones and Releasing Factors*  
by the Medicinal Chemistry Section of the Organic Chemistry Division of IUPAC—
 

R. SCHWYZER (Switzerland)	One Dimensional Organization and Readout Mechanism of the Biological Information of Hormones of the Hypophysis
H. D. NIALL (USA)	Growth Hormone and Lactogenic Hormones
E. WERLE (Germany)	Tissue Hormones with Particular Respect to those of the Kinin- and Angiotensin-Systems
A. V. SCHALLY (USA)	Physiological, Veterinary, and Clinical Effects of Hypothalamic Releasing Hormones, especially LH-RH
2. *Modern Methods for Treatment of Waste Water in Theory and Practice*  
by the Water Quality Section of the Applied Chemistry Division of IUPAC—
 

H. O. BOUVENG (Sweden)	Combined Chemical-biological Treatment Systems
J. C. BOEGLIN (France)	Flocculation Processes and Use of Precipitation and Sludge Dehydration Aids
W. J. WEBER, Jr. (USA)	Adsorption Processes
CHR. OEHME (Germany)	Ion Exchange
D. C. SAMMON (UK)	Membrane Processes

The plenary and main section lectures will be published in normal or supplementary issues of the IUPAC journal *Pure and Applied Chemistry*. Rapid publication is ensured by offset (lithographic) printing directly from the manuscripts supplied by the authors at the Symposium.

## Secretariat

Full details of the Congress, including the titles of accepted discussion papers, are available from:

Dr. W. FRITSCHÉ  
General Secretariat of XXIV IUPAC Congress  
c/o Gesellschaft Deutscher Chemiker  
Postfach 119075  
D-6000 Frankfurt/Main 8  
Germany

## III INTERNATIONAL CONFERENCE ON CHEMICAL THERMODYNAMICS

jointly with

## SYMPOSIUM ON PHYSICOCHEMICAL TECHNIQUES AT HIGH TEMPERATURES

Baden near Vienna, 3-7 September 1973

The dates of these meetings have been selected so that participants can attend the XXVII IUPAC Conference and the Van der Waals Centenary before and possibly the Russian Calorimetry Conference thereafter. They will be held in the newly rebuilt Congress Centre of Baden. This little town, a charming watering place, already known to the Romans, is situated between the Vienna Woods and famous vineyards. The distance Baden-Vienna is only 30 kilometres and trains and buses are frequent.

## CONFERENCE

The following plenary lectures will be given and subsequently published in the IUPAC journal *Pure and Applied Chemistry*:

- |                          |  |
|--------------------------|--|
| E. U. FRANCK (GFR)       | Polar and Ionic Liquids, including Elevated Pressures and Temperatures |
| J. S. ROWLINSON (UK)     | Nonelectrolytic Fluids and Fluid Mixtures                              |
| H. SACKMANN (GDR)        | Liquid Crystals  |
| V. A. SOKOLOV (USSR)     | High Temperature Calorimetry   |
| I. WADSÖ (Sweden)        | Thermodynamics of Substances of Biochemical Importance                 |
| E. F. WESTRUM, Jr. (USA) | Calorimetry of Solid-Solid Transitions                                 |

All other papers of the Conference will be grouped into sections, to insure thorough discussion:

1. Calorimetric techniques and apparatus
2. Thermochemical quantities, including enthalpies of combustion of reacting systems
3. Thermodynamic properties of pure fluids
4. Thermodynamics of fluid mixtures (nonassociating components)
5. Liquid mixtures with associating components (nonelectrolytes)
6. Solutions of electrolytes (including polycondensations)
7. Mixtures of metallic and ionic melts
8. Thermodynamics of interfaces
9. Thermodynamic properties in solid single- and multicomponent systems



10. Thermodynamics of systems of biochemical interest
11. Compilation and tabulation of thermodynamic data

The official languages will be English, French, German, and Russian, but the use of the English language is strongly recommended. No simultaneous translation will be provided.

## SYMPOSIUM

The principal objective will be to attempt to elucidate the experimental accuracy which can be achieved in the various aspects of physicochemical techniques at high temperatures (1000-4000 K). The results will guide the Commission for High Temperatures and Refractory Materials of IUPAC in setting up new standardization projects. The Symposium aims at a discussion of the experimental accuracy which can be obtained at high temperatures rather than at the presentation of promising but relatively semiquantitative techniques.

### Bookings

For booking of accommodation, all-in travel arrangements, and events in the social programme, please contact:

Intercongress Reisedienst und Betreuungs GmbH  
Stadiongasse 6-8  
A-1010 Wien, Austria

## SYMPOSIUM ON PLASMA CHEMISTRY

Kiel, 6-10 September 1973

This International Symposium is being organized in the University of Kiel by the Sub-Commission on Plasma Chemistry of IUPAC.

### Technical Programme

Six full-day or half-day sessions are planned, the technical schedule allowing for morning and evening lectures and formal discussions. Afternoons and the whole of Sunday, 9 September, have been left open for informal discussions. In each main session there will be one invited lecture of broad interest and a number of contributed papers. The invited lectures will be published in the IUPAC journal *Pure and Applied Chemistry*. Ample time will be available for formal discussion of both invited and contributed papers.

Sessions are planned on the following topics:

- (i) Elementary Chemical Reactions in Plasmas
- (ii) Chemistry of Gas-phase and Gas-solid Processes under Plasma Conditions
- (iii) Plasma Chemical Diagnostic Techniques
- (iv) Inorganic and Organic Synthesis under Plasma Conditions
- (v) Engineering Applications of Plasmas
- (vi) Panel Discussion—Topics to be covered include Standardization of Plasma Descriptions, Identification of Important Plasma Processes, International Sharing and Publication of Technical Information, and Industry-Government-University Cooperative Efforts

Room will be found for contributions of particular interest which do not

fall within any of the session topics. Contributions may be offered in any language, although it is hoped that speakers will use a language (preferably English) that is commonly understood by most participants. All speakers, but especially those using a language other than English, will be asked to consider carefully whether their visual aids are such as to make their presentations reasonably intelligible to all listeners.

### **Secretariat**

Details of registration, travel arrangements, and hotel accommodation may be obtained from:

Prof. H. SUHR  
Chemisches Institut der Universität Tübingen  
Auf der Morgenstelle  
D-7400 Tübingen 1  
Germany  
Telephone: 07122/712480

## **VI INTERNATIONAL MASS SPECTROMETRY CONFERENCE**

**Edinburgh, 10-14 September 1973**

The sixth in the series of triennial International Mass Spectrometry Conferences is being held in the University of Edinburgh this year. The Conference is sponsored by IUPAC and the mass spectrometry organizations of many countries: Belgium, Czechoslovakia, France (GAMS), Germany (DPG-MS), Italy, Japan (MSSJ), Netherlands, Sweden, UK (IP), USA (ASMS/ASTM), USSR, and Yugoslavia.

The scientific programme will cover most aspects of mass spectrometry and each topic will be introduced by a review paper given by a leading world authority in that field.

The ten plenary speakers are:

R. S. BERRY	J. DROWART
J. H. BEYNON	J. DURUP
J. BLOCK	J. B. HASTED
J. D. CRAGGS	R. E. HONIG
C. DJERASSI	T. L. ISENHOUR

For further information, write to:

Mr. C. H. MAYNARD  
Assistant General Secretary (Administration)  
Institute of Petroleum  
61 New Cavendish Street  
London W1M 8AR, UK

## **INTERNATIONAL CONGRESS ON IMPROVEMENT OF CHEMICAL EDUCATION**

**Wrocław, 17-22 September 1973**

The Congress is being sponsored by UNESCO and the Committee on

Teaching of Chemistry of IUPAC at the Institute of Chemistry, University of Wrocław, with the help of the Polish National Commission for UNESCO, Polish Academy of Sciences, and Polish Ministry of Science, Higher Education, and Technology. It is part of an ongoing programme for the improvement of chemical education which, in the past, has included the collaboration of UNESCO and IUPAC in the publication of a survey of chemical education at university level, a publication on evaluation in chemistry, as well as conferences in various countries on high school and university level chemical education.

### **Aims**

In addition to the exchange of ideas and information among those directly involved, the principal aims of the Congress will be:

1. To identify and analyze the present problems and recent trends (especially over the last four years) in chemical education, at all levels: within and outside the formal educational system.
2. In the light of this analysis, to outline a proposed four-year cooperative plan of action—among international, regional, and national organizations—for the further improvement of chemical education.
3. As a means of disseminating widely the analysis of the problems and the proposed solutions, to prepare material for Volume IV of *New Trends in Chemistry Teaching*.

### **Topics of Trend Papers**

In order to fulfil these aims, the main work of the Congress will be centred around the discussion and refinement of papers, circulated in advance of the Congress, which attempt to present comprehensive and objective analyses of the trends and problems in connection with different aspects of the overall subject of the improvement of chemical education. The areas in which such trend papers will be prepared have tentatively been identified as the following:

1. *Factors influencing chemical education*
  - (a) The public image of chemistry and society's needs
  - (b) The evolving needs of other professions
  - (c) The changing needs and views of industry
  - (d) Evolution in the nature and structure of chemistry
  - (e) The changing characteristics of students
  - (f) New understanding of the psychological processes of learning chemistry
  - (g) New and more detailed learning objectives in chemistry
  - (h) Variations in methods of teaching chemistry, including the role of laboratory work
  - (i) The enhanced potentialities of new educational technology
2. *New approaches to the process of designing and evaluating chemistry courses and programmes*
3. *Improved techniques of assessing student achievement*
4. *Trends in training and retraining chemistry teachers*
5. *National chemical education improvement—varying approaches*
6. *International cooperation in chemical education improvement*

### **Organization of Congress**

The criticism, discussion, and refinement of these working papers will take



place in simultaneous working groups. Plenary sessions will also be scheduled for keynote addresses, for debate of controversial issues, and for receiving reports of working group discussions. The official languages of the Congress will be English and French.

### **Attendance**

Attendance will be limited to about 250-300. Those wishing to receive an invitation should write to:

Division of Science Teaching  
UNESCO  
Place de Fontenoy  
F-75 Paris 7<sup>e</sup>  
France

## **IV INTERNATIONAL CONFERENCE ON NONAQUEOUS SOLUTIONS**

**Vienna, 10-12 July 1974**

The Conference is being sponsored by IUPAC and organized by Verein Österreichischer Chemiker.

### **Scope**

Recent developments on nonaqueous chemistry in its widest sense:

- (i) Reactions in Molecular Liquids as Solvents and Solvent Mixtures
- (ii) Reactions in Salt-Melts
- (iii) Reactions in Liquified Metals

### **Scientific Sessions and Papers**

Several plenary lectures and approximately 70 contributed papers will be presented. Because it is anticipated that the number of offered papers may exceed the number that can conveniently be presented, a selection may be made by the Executive Committee if necessary. For each paper 18 minutes will be available for presentation with an additional 7 minutes for discussion. Deadline for submission of the abstract: 15 January 1974.

### **Publications**

Plenary lectures will be published in the IUPAC journal *Pure and Applied Chemistry*. Abstracts of all other scientific contributions will be distributed to all participants at the meeting.

### **Language**

The official language is English. Although there is no argument against the use of any other language, it is recommended that papers be presented in English. Translation facilities will not be available. Speakers in other languages are recommended to distribute a written text in English at the presentation of their contribution.

### **Correspondence**

This should be sent to the Secretary of the Executive Committee:

Dr. H. SCHINDLBAUER  
Verein Österreichischer Chemiker  
(IV ICNAS)  
Eschenbachgasse 9  
A-1010 Wien, Austria

## **VII INTERNATIONAL SYMPOSIUM ON CARBOHYDRATE CHEMISTRY**

**Bratislava, August 1974**

The Symposium will cover the following subjects:

- (i) Theoretical Studies—physical chemistry, organic synthesis, reaction mechanisms, stereochemistry, and related topics
- (ii) Plant and Wood Polysaccharides—plant gums, polyuronides, cellulose, hemicellulose, and lignin-saccharide complexes
- (iii) Biochemistry—enzymes of carbohydrate metabolism, properties and structure of biologically active complex saccharides and cell wall polymers

The official languages will be Russian and English. All Symposium literature will be published in English. No translation service will be available.

### **General Information**

Those wishing to attend or present a paper should write to:

VII International Symposium on Carbohydrate Chemistry  
c/o Institute of Chemistry  
Slovak Academy of Sciences  
Dúbravská cesta  
809 33 Bratislava  
Czechoslovakia

## **INTERNATIONAL SYMPOSIUM ON MACROMOLECULES**

**Madrid, 15-20 September, 1974**

The meeting will be organized by Instituto de Plásticos y Caucho and it will take place at the Palacio de Congresos (Congress Palace) of Madrid.

### **Programme**

Emphasis will be given to the relationship between chemical structure and properties of polymers.

The programme will be arranged in four main Sections and main lectures will be given as a separate series. Each Section will consist of a limited number of invited lecturers and contributed papers.

The Scientific Programme Committee will consider papers of interest in relation to the following topics:

1. New developments in polymerization
2. Chemical modifications and reactions on polymers

3. Properties in amorphous and crystalline polymers
4. Influence of structure on technical properties

The main lectures will be published in the IUPAC official journal *Pure and Applied Chemistry* and the Symposium Committee will publish the preprints of all contributed papers. These preprints will be available to all registered participants.

### **Symposium Languages**

The invited lectures will be given in English. Contributed papers may be presented in any language, but the organizers suggest that speakers should use preferably English or French that is commonly understood by most participants. Simultaneous translation will not be arranged.

### **Correspondence**

Enquiries and other correspondence concerning the Symposium should be addressed to:

Prof. J. G. FATOU, General Secretary  
International Symposium on Macromolecules  
c/o Instituto de Plásticos y Caucho  
Juan de la Cierva 3,  
Madrid-6, Spain



## **25th ANNIVERSARY OF WORLD HEALTH ORGANIZATION**

World Health Day, which marks the entry into force of the Constitution of WHO, is observed every 7th April as an extensive effort to disseminate information on a chosen theme of public health. The theme for 1973 is 'Health Begins at Home', which seeks to underline the part the family plays in promoting the health of its members and the role of health services in meeting family needs. In 1973, WHO also completes 25 years of its existence.

In its capacity of a nongovernmental organization in official relations with WHO, IUPAC contributes to the marking of the anniversary by publishing the Director-General's message.

### **Message from Dr. M. G. Candau**

#### **Director-General of the World Health Organization for WORLD HEALTH DAY, 1973**

The World Health Organization ever since its inception in 1948 has concentrated on health problems affecting millions, hundreds of millions of people. Yet it seems to me fitting that on this World Health Day, WHO's twenty-fifth anniversary, we should concern ourselves with health in the little world of the family at home. Just as international health security depends on the level of health of each country in the world community, so the health of the city, the village, the hamlet depends on the state of health in the homes that make it up.

There are innumerable ways of making the home a healthier place. Learning more about health, making the best use of available foods, disposing properly of wastes dangerous to health, helping children to grow up strong and self-reliant, planning the family so that each child has a better, brighter chance of succeeding in life, taking some basic precautions against accidents, protecting the happiness of old people—these are but a few suggestions.

In many such actions, the family needs service from the community. Water supply, vaccination against communicable diseases, and help to mothers in pregnancy and childbirth are obvious examples. Another reason why community services are important is that, in many a home today, the elders are living in conditions very different from those they knew when they were young. In the overcrowded city, for example, their time-tested ways are perhaps no longer appropriate. Community action can smooth the process of adaptation.

Efforts to lead a healthier life may of course be foiled by one's neighbours' illness or by his bad habits; but if some diseases are communicable, so are good habits and healthy ways of living. Everybody can contribute to world health by making health begin at home.

The remarks made at the XXV World Health Assembly (Geneva, May 1972) by the official representative of ICSU and IUPAC, Dr. R. MORF, are also relevant on this important occasion:

'The Scientific Union and all chemists and biochemists wish particularly to stress the great desirability of maintaining fruitful relationships with WHO. There are examples of effective cooperation at all levels. I will mention only the Joint FAO/WHO Expert Committees, the Committees for the determination of acceptable maximum concentrations of toxic substances, the work on narcotics control and our joint efforts to ensure high quality in medicinal drugs.

As long as fifteen years ago, when the politicians and the mass media did not even know the term 'human environment', IUPAC conducted in-depth studies and held symposia in search of means for protecting man in his work and in his environment. Thanks to the foresight of your Director-General and his staff in Geneva, these symposia were held and the findings published under joint WHO/IUPAC sponsorship. I am very happy to take this opportunity of expressing deep gratitude for WHO's assistance.

Now, it is not necessary here at the World Health Assembly, which is composed of medical scientists, to list the manifold contributions of chemical and biological research and industry to world health.

As for the future, in the context of the protection of the human environment, you will certainly agree with me that there is too much talk at all levels and that it is for medical experts, hand in hand with the chemists, to undertake some effective work.

Our three worldwide organizations, with their long experience of effective cooperation, are well equipped to get to work for the real protection of the health of the world.'

### **Some Past Results and Present Programmes in WHO Supported Research**

Some significant contributions to science and technology, in which it can reasonably be claimed that WHO has played a major role, are as follows:

1. Evaluation of the effectiveness, or lack thereof, of recently developed biological products (vaccines and sera) for polio, measles, smallpox, rabies, typhoid, cholera, tuberculosis, brucellosis, leptospirosis, and cysticercosis;
2. Clarification of the epidemiology of the above group of diseases as well as of cancer, cardiovascular diseases, influenza, dengue, and other arbovirus infections, trachoma, and in parasitic diseases, malaria, toxoplasmosis, schistosomiasis, and hydatidosis amongst others;
3. Characterization of immune-complex nephritis in malaria and shock syndrome in dengue hemorrhagic fever;
4. Comparative studies in the chemotherapy of yaws, tuberculosis, leprosy, schistosomiasis, and brucellosis;
5. Insights into malnutrition, especially protein-calorie deficiencies and their relationship to infective agents;
6. Studies on the biology of many insect vectors and of their resistance to insecticides;
7. The development of nearly 300 biological standards and working preparations to provide baseline references for all countries;

8. Progress in international uniformity of diagnostic criteria and technical procedures for many of the major communicable and noncommunicable diseases (e.g., malnutrition, mental disorders, and the chronic degenerative diseases).

It should be noted that these contributions have been mainly in fields requiring comparative studies in differing economic, social, and ecological settings.

WHO-supported research is continuing on most of the above items and on many others not mentioned. In addition, its present research programme includes expanded activities in the biology of human reproduction and the development of contraceptive devices, comparative studies in schizophrenia, technological control of environmental pollution, human genetics, the immunological basis of disease, operational research for health care delivery, and systems analysis in health planning at national and local levels.

### **Priorities for the Future**

There remain, however, several largely unfulfilled priority areas of work in WHO where science and technology play a most important role:

1. *Development of a worldwide health information network.* There is great need for much more rapid development of a computerized health information network linking all countries to a centralized facility in Geneva. With present and foreseeable resources this may take decades to achieve.

2. *Parasitic diseases.* A very great increase in fundamental and applied research on this group of diseases is urgently required using the talents and resources of major institutions and from various disciplines in both economically advanced and developing countries.

3. *The biology of human reproduction.* Our ignorance of many basic features of the physiology and psychology of human reproduction is profound, and this impedes progress in the development of contraceptive techniques appropriate for different economic and social conditions in countries that wish to apply such techniques. WHO has expanded its programme here and, although an appreciable amount of work is in progress in laboratories and institutes throughout the world, the magnitude and complexity of this field call for a vastly increased effort. One need scarcely emphasize the urgency of this problem.

4. *Toxic chemicals.* An intensified attack on pharmacotoxicological problems, especially at the molecular level, is needed to clarify the actions of chemicals. We must also have largescale animal toxicity studies on the carcinogenic, mutagenic, teratogenic, and other toxic potentials of the large number of chemicals, including medicines, to which man is increasingly exposed. In this sector particularly and in that of human reproduction above, one could perceive a need and justification for establishing internationally operated institutes that would be linked to national, university and other efforts. We continue to witness their exacerbation in the absence of adequate international institutions for dealing with them.

5. *Improved technological aids.* These include instrumentation for diagnostic and survey procedures in mass campaigns against communicable diseases, and for population studies in human genetics, nutrition and metabolic disorders; and less expensive technological procedures for environmental pollutants, sanitation, and prosthetic devices.



# ACTIVITIES OF OTHER INTERNATIONAL UNIONS

## IV INTERNATIONAL CONGRESS OF FOOD SCIENCE AND TECHNOLOGY

Madrid, 22-27 September 1974

Previous meetings in this series took place in London (1962), Warsaw (1966), and Washington, DC (1970). The present Congress is sponsored by IUFoST and organized by the National Institute of Food Science and Technology of Spain (INCYTA).

### Scientific Programme

There will be two different kinds of session, those for presentation of research papers and round-table discussions.

The topics for the general paper sessions have been selected as follows:

1. *Chemistry and Biochemistry of Foods*
  - (a) Chemical constituents of foods in relation to flavour, colour, texture, and other sensory properties
  - (b) Chemistry and biochemistry of food deterioration
  - (c) Histochemistry of food raw materials and finished products
  - (d) New or improved food additives
2. *Physical Properties of Food*
  - (a) Raw materials
  - (b) Finished products
3. *Sensory Properties of Foods*
  - (a) Methodology
  - (b) Instrumental methods and their validation
4. *Microbiology of Foods*
  - (a) Microbial processes for producing foods
  - (b) Spoilage of foods by microbes
  - (c) Human infections and intoxications due to microbes associated with foods
5. *Food Processing*
  - (a) New preservation methods
  - (b) Newer methods for aroma recovery and their preservation
6. *Food Engineering*

Heat and mass transfer
7. *Food Science and Nutrition*
  - (a) Retention of nutritive value of food during processing and preservation
  - (b) New food sources of key nutrients
  - (c) Exploiting local food raw materials
  - (d) Synthetic and near synthetic foods
8. *Food Safety and Sanitation*
  - (a) Toxic substances in food, including analysis
  - (b) Newer methods for food plant sanitation
9. *Environmental Pollution*

The following themes have been decided for round-table discussions:

1. Current experience of waste treatment in the food industry
2. Techniques in the forecasting of food research needs
3. Agricultural pollutants in foods: how to fight them
4. Education and training on food science and technology: curricula and text books
5. Evaluation of consumer's needs in relation to price and quality
6. Food science and technology journals
7. Need for cooperation between research centres and international agencies for industrial development: (a) Scientific aspects, (b) Technological aspects —Technology transfer in food processing industries

### Secretariat

For further information please contact:

Secretaria del IV Congress Internacional de  
Ciencia y Tecnología de Alimentos  
c/o Instituto de Agroquímica y Tecnología de Alimentos  
Jaime Roig 11  
Valencia-10  
Spain

## MOLECULAR STRUCTURES AND DIMENSIONS

*Interatomic Distances 1960-65, Organic and Organometallic Crystal Structures* was published for the International Union of Crystallography and the Crystallographic Data Centre, Cambridge (UK), by Oosthoek Publishing Co. in March 1973 at a price of Netherlands guilders 175. Copies for the personal use of scientists may be obtained at a reduced price of Netherlands guilders 125.

This book, Volume A1 in the *Molecular Structures and Dimensions* series, is a continuation of *Tables of Interatomic Distances and Configuration in Molecules and Ions*, which covered the literature up to the end of 1959. It has been prepared by the Crystallographic Data Centre and contains numerical data, including bond lengths, bond angles and torsion angles, for about 1,300 structures analyzed by X-ray and neutron diffraction. The entries are illustrated by specially prepared stereoscopic diagrams and by chemical formulae. All bond lengths were checked by computer and errors detected were traced and corrected as far as possible. Torsion angles of greatest conformational interest were selected and these were calculated from published coordinates. Only rarely have they been listed in the original publication. There are extensive summary tables of bond lengths, arranged by element-pairs, and a variety of indexes.

Volume 4 in the *Molecular Structure and Dimensions* series, *Bibliography 1971-1972, Organic and Organometallic Crystal Structures*, was also published in March 1973. It contains classified bibliographic information for structures published during 1971-1972. Entries are arranged in 86 chemical classes and cover organic compounds, complexes, organometals, and organometalloids.

The price of Volume 4 is Netherlands guilders 55. Copies for the personal use of scientists may be obtained at a reduced price of Netherlands guilders 39. The prices of all volumes in the series are fixed in Netherlands guilders. The US \$ and sterling equivalents are subject to exchange rate fluctuations.

Both of these volumes may be ordered from Oosthoek Publishing Co., Domstraat 5-13, Utrecht, Netherlands. Alternatively, orders may be placed with Polycrystal Book Service, POB 11567, Pittsburgh, Pennsylvania 15238, USA, with the Crystallographic Data Centre, Lensfield Road, Cambridge CB2 1EW, UK, or with any bookseller.

## PROBLEMS OF THE ENVIRONMENT

The Scientific Committee on Problems of the Environment (SCOPE) was established by ICSU in 1969:

- (a) to advance knowledge of the influence of man and his activities upon his environment, as well as the effects of these alterations upon man, his health, and his welfare, with particular attention to these influences and effects which are either global or shared in common by several nations;
- (b) to serve as a nongovernmental, interdisciplinary, and international council of scientists and as a nongovernmental source of advice for the benefit of governments and intergovernmental agencies with respect to environmental problems.

The following Reports have been issued to date by SCOPE:

- No. 1 *Global Environmental Monitoring*—A report submitted to the United Nations Conference on the Human Environment (Stockholm, 1972) by the Commission on Monitoring—1971, 67 pp., \$2.00
- No. 2 *Man-made Lakes as Modified Ecosystems*—Working Group on Man-made Lakes—1972, 76 pp., \$2.00

Copies are available from:

Mr. H. A. W. SOUTON  
Executive Secretary of SCOPE  
c/o Royal Society  
6 Carlton House Terrace  
London SW1Y 5AG, UK

A major article about SCOPE will be published later this year in *Information Bulletin* No. 46. It is being prepared by Dr. W. GALLAY, official representative of IUPAC to SCOPE.



## ICSU ABSTRACTING BOARD

The ICSU Abstracting Board was established in 1953 for the purposes of organizing and promoting internationally the exchange and dissemination of information by secondary processing services in science and technology, and to deal with matters related thereto. The immediate Past-President of the Board is Dr. B. RIEGEL (USA), who was the official representative of IUPAC. The present representative of IUPAC is Dr. J. W. BARRETT (UK).

The Board has recently issued a leaflet on:

### COOPERATION AMONG EDITORS

#### **Some Guidelines for Primary Publications and Abstracting and Indexing Services**

Primary serial publications form the bulk of the material which is scanned and processed by the abstracting and indexing services. In turn, abstracting and indexing services provide access to the world literature. Primary publications and abstracting and indexing services have much to gain from close contact and cooperation.

Many major abstracting and indexing services cooperate through the ICSU AB. Many editors of primary publications are federated in several Associations of Editors. As a result of a joint meeting held in Orleans, France, in July 1971, where problems of cooperation were discussed, a joint Working Group of representatives of these various bodies was formed.

The purpose of this document, which has been prepared by this Working Group and endorsed by the ICSU AB and several Associations of Editors of primary publications, is to list some of the types of cooperation already in existence or capable of development.

#### **What can Abstracting and Indexing Services do for Primary Publications?**

##### *Provide Information*

In order to manage their operations efficiently, abstracting and indexing services prepare statistical and other pertinent information. They are ready to make this available to editors of primary publications.

Information that could be provided includes:

- Statistics on the number of papers selected by an abstracting and indexing service in a given period from a publication.
- The uses made of author abstracts (*e.g.*, Are editorial changes made? Are such changes major or minor? Are the papers reabstracted?).
- The use made of a journal for different purposes by abstracting and indexing services in providing a range of products and services.
- The procedure used by abstracting and indexing services for processing a paper (*e.g.*, rules for the preparation of abstracts, for the handling of co-authors' names, for translation and transliteration, for the preparation of indexes).
- Statistics on the retrieval of individual papers from those services that provide search programmes.

### *Render Assistance*

In the course of the preparation of their various products, abstracting and indexing services elaborate and store information. Much of this information is of direct use to primary publications and can be made available to their editors through special arrangements.

An example of such services is the preparation of the indexes of several Earth Science journals by the American Geological Institute at a very moderate charge. Similar arrangements are possible between other abstracting and indexing services and other primary publications.

Other services that could be provided include:

- Notification of scientific, technical, and typographical errors discovered in the course of the processing of papers by abstracting and indexing services.
- Provision of lists of the most commonly used indexing terms in a discipline, with an indication of preferred alternatives.

### **What can Editors of Primary Publications do for Abstracting and Indexing Services?**

#### *Provide Information*

Editors of primary publications can inform the abstracting and indexing services as soon as practicable of impending changes in the scope, policy, name, *etc.*, of existing publications, of the death of existing publications, and of the birth of new ones.

#### *Render Assistance*

Editors of primary publications can help the abstracting and indexing services to improve the quality, speed, and coverage of their services by:

- Ensuring that every paper (including short communications, notes, and letters to the editor) carries a suitable abstract for which the editor accepts responsibility.
- Ensuring that the titles of the papers are brief yet significant enough to be used by abstracting and indexing services without modification. This is particularly important to services whose products are based on titles alone.
- Providing early copies of the publication by air mail.
- Providing criticism of abstracts published by abstracting and indexing services.

### **How to Do It**

Cooperation is usually a matter of bilateral agreement and arrangement between a particular publication and a particular abstracting and indexing service. If any problem occurs, or if the editor of a primary publication is uncertain about which abstracting and indexing service to approach, or if his request involves several services, it is the role of the ICSU AB to advise and help.

### **The Future**

Both abstracting and indexing services and the primary publications are dynamically evolving in order to provide better services to the world community. For greater efficiency and effectiveness their evolutionary processes must be interlinked, and their needs for mutual help will evolve also. Some

of their present needs are outlined here, others have undoubtedly been overlooked. The Working Group welcomes ideas and suggestions; these should be addressed to the General Secretary of the ICSU AB, 17 rue Mirabeau, F-75016 Paris, France.

The ICSU AB regards the joint Working Group as a very important part of its developing structure. These guidelines represent only the first stage of its work.

## **PROCEEDINGS OF 1972 MEETING OF ICSU ABSTRACTING BOARD**

The 1972 Full Board meetings of the ICSU AB were held in Ustaoset, Norway, at the kind invitation of the International Union of Biological Sciences. The proceedings (286 pp.) are now available and comprise:

- In the first part a detailed description of the activities of the Board.
- The second and third parts record the most recent developments in the activities of the ICSU AB Member Unions, Member Countries, and Member Services (the largest Abstracting and Indexing Services all over the world) in all aspects of scientific and technical information.
- The fourth part comprises reports from the most important international organizations active in scientific and technical information.
- In the fifth part the proceedings of a Round Table on 'Education of Scientists in the use of Information' are recorded.
- Papers presented at a special session on the Indexing of Primary Journals are given in the sixth part.
- Finally, the seventh part is an outline of another special session which was devoted to an interchange of views about marketing of secondary information services.

This publication represents an up-to-date overview of the most recent developments in scientific and technical information world wide. Copies may be purchased (US \$ 15.00 plus mailing charges) from:

ICSU AB Secretariat  
17 rue Mirabeau  
F-75016 Paris, France



## INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

Founded in 1946, ISO is a governmental organization which has responsibilities, through its member national standard organizations, to many people in industry and government. IUPAC is a nongovernmental organization which generates recommendations which, when relevant, are usually considered by ISO and may be incorporated in its international standards.

Steps have been taken by IUPAC to improve its collaboration with ISO and ensure minimal overlap in work programmes. Draft international standards produced by appropriate ISO Technical Committees are sent automatically for consideration and comment by IUPAC bodies. The first direct acknowledgement of this collaboration has recently been recorded with the issue of *ISO International Standard 1000: SI Units and Recommendations for the Use of their Multiples and of Certain Other Units*. This Standard contains the wording 'The document was also approved by the International Union of Pure and Applied Chemistry'.

The new standard is a revised version of one of ISO's most significant documents, ISO/R 1000, published in 1969. It is updated in line with decisions taken by the *Conférence Générale des Poids et Mesures* (CGPM) and recommendations by its International Committee (CIPM). Thus, to the six original base SI units (metre, kilogram, second, ampere, kelvin, and candela) is added a seventh—the mole, which is used as the unit of amount of substance. Two new derived special names and symbols for two derived units, the pascal (Pa) for pressure and stress and the siemens (S) for electrical conductance, have also been added to the existing 13 special names in the approved table. The entire document has also been reviewed and rearranged, and two new sections have been added dealing, respectively, with units of light and related electromagnetic radiations and with units of acoustics.

ISO 1000 explains the International System of Units and gives guidance for its use and for forming and selecting decimal multiples and submultiples of SI units, by use of the SI prefixes for application in the various fields of science and technology. The SI units constitute the world's first truly international system of units. The system is rapidly gaining global acceptance. Widespread use of SI units in education, research, industry, and commerce will help remove confusion, inconvenience, and obstacles to international trade and communications.

It is worth noting that a recent survey of ISO technical work revealed TC 47 [Chemistry (standardization and particularly test methods and methods of analysis for basic chemical products and bulk materials)] to be the most productive committee for generating ISO standards. This imposes a heavy programme of collaborative work on the IUPAC side for its Commission on Analytical Reactions and Reagents (V.1).

IUPAC is now invited to nominate a representative to attend meetings of ISO Technical Committees concerned with chemistry. ISO, in turn, is beginning to send observers to meetings of IUPAC bodies in which it is interested.

# IUPAC PUBLICATIONS

1972

A compilation of IUPAC Publications in 1971 was published in *Information Bulletin* Nos. 42/43 (July 1972). The present listing attempts to cover everything issued during 1972.

*The IUPAC Secretariat would be pleased to receive notification of any omissions from this listing, especially of translations completed or in process of being prepared of IUPAC nomenclature recommendations.*

## Pure and Applied Chemistry\*

- Vol. 29, Nos. 1-3: Plenary and Main Technical Lectures from International Congress on Industrial Waste Water, Stockholm (Sweden), November 1970  
Commission on Thermodynamics and Thermochemistry: A Guide to Procedures for Publication of Thermodynamic Data  
Commission on Microchemical Techniques and Trace Analysis: Erreurs en Microanalyse Organique Élémentaire—Première Partie
- Vol. 29, No. 4: Main Lectures from International Meeting on Boron Compounds, Castle Liblice near Prague (Czechoslovakia), June 1971  
Commission on Physicochemical Measurements and Standards: Catalogue of Physicochemical Standard Substances  
Commission on Analytical Nomenclature: Recommendations on Ion Exchange Nomenclature  
Commission on Molecular Structure and Spectroscopy: Recommendations for Presentation of NMR Data for Publication in Chemical Journals  
Commission on Microchemical Techniques and Trace Analysis: Erreurs en Microanalyse Organique Élémentaire—Deuxième Partie
- Vol. 30, Nos. 1-2: Plenary and Main Lectures from International Conference on Chemical Transformations of Polymers, Bratislava (Czechoslovakia), June 1971  
Commission on Microchemical Techniques and Trace Analysis: Erreurs en Microanalyse Organique Élémentaire—Troisième Partie
- Vol. 30, Nos. 3-4: Plenary and Section Lectures from V International Conference on Organometallic Chemistry, Moscow (USSR), August 1971  
Commission on Atomic Weights: Atomic Weights of the Elements 1971  
Commission on Spectrochemical and other Optical Procedures for Analysis: Nomenclature, Symbols, Units, and their Usage in Spectrochemical Analysis-I. General Atomic Emission Spectroscopy  
Commission on Nomenclature of Inorganic Analysis: Nomenclature of Inorganic Boron Compounds
- Vol. 31, Nos. 1-2: Main Lectures from VIII and IX Microsymposia on Macromolecules, Morphology of Polymers and Thermodynamics of Interactions in Polymer Solutions, respectively, Prague (Czechoslovakia), August/September 1971

\*Official journal of IUPAC and additional publications of the Union are available from Butterworth & Co. (Publishers) Ltd., 88 Kingsway, London WC2B 6AB, UK.

Much of the important material which appears in the journal is published shortly afterwards in book form.

- Commission on Nomenclature of Organic Chemistry and IUPAC-IUB  
Commission on Biochemical Nomenclature: Definitive Rules for Nomenclature of Steroids
- Vol. 31, No. 3: Invited Lectures presented at International Symposium on Chemical Education, São Paulo (Brazil), August/September 1971  
Commission on High Temperatures and Refractory Materials: Analysis of Interlaboratory Measurements on the Vapour Pressure of Gold; Analysis of Interlaboratory Measurements on the Vapour Pressure of Cadmium and Silver
- Vol. 31, No. 4: Plenary Lectures from III National Conference on Analytical Chemistry, Braşov (Romania), September 1971  
Commission on Colloid and Surface Chemistry: Manual of Symbols and Terminology for Physicochemical Quantities and Units: Appendix II—Definitions, Terminology, and Symbols in Colloid and Surface Chemistry IUPAC-IUB Commission on Biochemical Nomenclature: A One-letter Notation for Amino Acid Sequences (Definitive Rules); Definitive Rules for Naming Synthetic Modifications of Natural Peptides
- Vol. 32, Nos. 1-4: Invited Lectures from IV International Symposium on Magnetic Resonance, Rehovot/Jerusalem (Israel), August 1971

### Information Bulletin\*

Nos. 42/43, July 1972

[Commission on Microchemical Techniques and Trace Analysis: Study on Purification of Chemicals for Trace Analysis]

No. 44, December 1972

#### *Appendices on Tentative Nomenclature, Symbols, Units, and Standards*

- No. 14, February 1972: Recommendations on Nomenclature for Contamination Phenomena in Precipitation from Aqueous Solutions (Commission on Analytical Nomenclature)
- No. 15, February 1972: Recommendations on Nomenclature for Chromatography (Commission on Analytical Nomenclature)
- No. 16, February 1972: Recommendations for Nomenclature of Thermal Analysis (Commission on Analytical Nomenclature)
- No. 17, February 1972: Recommendations for Nomenclature of Mass Spectrometry (Commission on Analytical Nomenclature)
- No. 18, February 1972: Recommendations on Nomenclature of Scales of Working in Analysis (Commission on Analytical Nomenclature)
- No. 19, February 1972: Rules for Nomenclature of Carotenoids (Commission on Nomenclature of Organic Chemistry and IUPAC-IUB Commission on Biochemical Nomenclature)
- †No. 20, February 1972: Quantities and Units in Clinical Chemistry (Commission on Quantities and Units in Clinical Chemistry and International Federation of Clinical Chemistry)
- †No. 21, February 1972: List of Quantities in Clinical Chemistry (Commission on Quantities and Units in Clinical Chemistry and International Federation of Clinical Chemistry)
- No. 22, June 1972: Nomenclature of Multiple Forms of Enzymes (IUPAC-IUB Commission on Biochemical Nomenclature)

\*Available from IUPAC Secretariat.

†Now out of print.



- No. 23, June 1972: Symbols for Amino Acid Derivatives and Peptides (IUPAC-IUB Commission on Biochemical Nomenclature)
- No. 24, June 1972: Recommended Names and Symbols for Light and Related Electromagnetic Radiation (Commission on Physicochemical Symbols, Terminology, and Units)
- No. 25, June 1972: Recommendations on Nomenclature for Nuclear Chemistry (Commission on Analytical Radiochemistry and Nuclear Materials)
- No. 26, November 1972: Nomenclature, Symbols, Units, and their Usage in Spectrochemical Analysis-II. Terms and Symbols Related to Analytical Functions and their Figures of Merit (Commission on Spectrochemical and Other Optical Procedures for Analysis)
- No. 27, November 1972: Nomenclature, Symbols, Units, and their Usage in Spectrochemical Analysis-III. Analytical Flame Spectroscopy and Associated Procedures (Commission on Spectrochemical and Other Optical Procedures for Analysis)
- \*No. 28, November 1972: Electrochemical Definitions and Symbols (Commission on Electrochemistry)
- No. 29, November 1972: Nomenclature of Regular Single-strand Organic Polymers (Commission on Macromolecular Nomenclature)

#### *Technical Reports Appendices*

- \*No. 4, February 1972: Recommended Method for Benzo(a)pyrene in Foods (Commission on Trace Substances)
- \*No. 5, February 1972: A Survey of Analytical Procedures for Traces of N-Nitrosamines in Foods (Commission on Trace Substances)
- No. 6, November 1972: Collaborative Study of the Stability of Aflatoxin M<sub>1</sub> Standards (Commission on Food Contaminants)

### **Comptes Rendus IUPAC Conferences†**

Comptes Rendus XXVI Conference, Washington, DC (USA), July 1971.

### **Miscellaneous**

- †Survey of Chemistry Teaching at University Level
- ‡International Thermodynamic Tables of the Fluid State: Argon 1971
- ‡Dissociation Constants of Organic Bases in Aqueous Solution: Supplement 1972
- ¶Environmental Quality and Safety-I. Global Aspects of Chemistry, Toxicology, and Technology as Applied to the Environment: Incorporating Review Lectures and Original Contributions from International Symposium on Chemistry of Pesticides under Metabolic Conditions, Bonn (Germany), September 1970
- \*\*Pesticide Chemistry, Vols. I-VI: Proceedings of II International Congress of Pesticide Chemistry, Tel Aviv (Israel), February 1971
- ††Proceedings of International Symposium on Identification and Measurement of Environmental Pollutants, Ottawa (Canada), June 1971

\*Now out of print.

†Available from IUPAC Secretariat

‡Available from Butterworth & Co. (Publishers) Ltd., London.

¶Available from Georg Thieme, Stuttgart-Academic Press, New York-London.

\*\*Available from Gordon and Breach Science Publishers, New York.

††Available from National Research Council of Canada, Ottawa.

- §Crystal Growth 1971: Proceedings of III International Conference on Crystal Growth, Marseille (France), July 1971
- ||Atomic Masses and Fundamental Constants 4: Proceedings of IV International Conference on Atomic Masses and Fundamental Constants, Teddington (UK), September 1971
- \*Proceedings (Vols. 1 and 2) of VIII International Conference on Radiocarbon Dating, Lower Hutt (New Zealand), October 1972
- †Japanese translation of Nomenclature of Organic Chemistry: Sections A, B (Third Edition) and Section C (Second Edition), 1971
- ‡Magnitudes y Unidades en Química Clínica—Spanish translation of Quantities and Units in Clinical Chemistry including Recommendation 1966, 1967
- ¶A Magyar Kémiai Elnevezés és Helyesírás Szabályai (Vols. 1 and 2)—Hungarian Chemical Nomenclature and Orthography, based on recommendations of IUPAC
- ††Bulletin of Thermodynamics and Thermochemistry—No. 15, May 1972
- \*\*Bibliography on the High Temperature Chemistry and Physics of Materials:  
 Vol. 16, No. 1: January-March 1972  
 Vol. 16, No. 2: April-June 1972  
 Vol. 16, No. 3: July-September 1972  
 Vol. 16, No. 4: October-December 1972
- Assessment of Application Properties of Brushing Paints, *Journal of Paint Technology* **43**, 60 (1971)

§Available from North-Holland Publishing Co., Amsterdam.

||Available from Plenum Press, London-New York.

\*Available from Royal Society of New Zealand, Wellington.

†Available from Nankodo Co. Ltd., Tokyo.

‡Available from EUDEBA Editorial Universitaria de Buenos Aires.

¶Available from Akadémiai Kiadó, Budapest.

††Available from Publications Distribution Service, University of Michigan, 615 East University Avenue, Ann Arbor, Michigan 48106, USA.

\*\*Available from Dr. M. G. HOCKING, Department of Metallurgy, Imperial College of Science and Technology, London SW7 2BP, UK.

## FINAL REPORTS FROM IUPAC

The following Final (Definitive) Reports have so far been published in *Pure and Applied Chemistry* during 1973:

1. Recommended Methods for the Analysis of Alkyd Resins (Section on Organic Coatings): **33**(2-3), 411-436.
2. Abbreviated Nomenclature of Synthetic Polypeptides (Polymerized Amino Acids) (IUPAC-IUB Commission on Biochemical Nomenclature): **33**(2-3), 437-444.
3. Nomenclature for Vitamins B-6 and Related Compounds (IUPAC-IUB Commission on Biochemical Nomenclature): **33**(2-3), 445-452.
4. Tables of Wavenumbers for Calibration of Infrared Spectrometers-III and IV: 600—1cm<sup>-1</sup> (Commission on Molecular Structure and Spectroscopy): **33**(4), 605-652.

Subject to the prior agreement of IUPAC, the final nomenclature recommendations in Reports 2 and 3 may be:

- (a) Republished in the journals of National Adhering Organizations and National Societies (but not of commercial publishers)
- (b) Translated into other languages through National Adhering Organizations

## FORTHCOMING APPENDICES TO IUPAC INFORMATION BULLETIN

The following Appendices are expected to appear soon:

### *Appendices on Tentative Nomenclature, Symbols, Units, and Standards*

Nomenclature of Iron-Sulfur Proteins (IUPAC-IUB Commission on Biochemical Nomenclature)

Classification and Nomenclature of Electroanalytical Techniques (Commission on Electroanalytical Chemistry)

Nomenclature and Conventions for Reporting Mössbauer Spectroscopic Data (Commission on Molecular Structure and Spectroscopy)

Nomenclature of Organic Chemistry, Section D: Organoelement Compounds (Commissions on Nomenclature of Organic and Inorganic Chemistry)

### *Technical Reports*

A Survey of Some Recommendations for Identification and Determination of the Phenol Group (Commission on Analytical Reactions and Reagents)

Recommended Method for Aflatoxins in Cocoa Beans (Commission on Food Contaminants)

Subscribers to the *Information Bulletin* receive all Appendices automatically and free-of-charge on publication.



## **FORTHCOMING IUPAC PUBLICATIONS FROM BUTTERWORTHS**

### **IUPAC INTERNATIONAL THERMODYNAMIC TABLES OF THE FLUID STATE**

#### **Ethylene 1972**

This series provides internationally agreed values of the equilibrium thermodynamic properties of liquids and gases. The range covered for each property is that for which reliable experimental data exists. Values are presented as tables upon the basis of which scientists and technologists may produce equations appropriate to their specific requirements. The first volume, *Argon 1971*, appeared in 1972. *Ethylene 1972* is currently being prepared for press.

### **EXPERIMENTAL THERMODYNAMICS**

Volume I was published in 1968, on behalf of the IUPAC Commission on Thermodynamics and Thermochemistry, under the subtitle of *Calorimetry of Nonreacting Systems*. The second volume—*Thermodynamics of Nonreacting Fluids*—has been compiled under the joint editorship of Prof. B. VODAR and Dr. B. LE NEIDRE of Centre National de la Recherche Scientifique, Bellevue, France. Publication is expected towards the end of 1973 or early in 1974.

## **CHEMICAL PLANT TAXONOMY NEWSLETTER**

The Newsletter, which has associations with the IUPAC Commission on Chemotaxonomy, aims to provide information about meetings and symposia, new research programmes, recent publications, and vital statistics relevant to cryptogamic and phanerogamic chemotaxonomy.

Newsletter No. 19 appeared in January 1973. Present plans are for publication on (or near) 1 January or 1 June each year. Printing costs must be provided by money contributed towards the costs of publication or by subscription charges. A contribution of the equivalent of US \$2.00 should meet the cost of printing through 1974.

Persons wishing to receive the Newsletter should send their cheque or money order to the Editor:

Dr. J. A. MEARS  
Phytochemistry Laboratory  
Academy of Natural Sciences of Philadelphia  
19th and the Parkway  
Philadelphia, Pennsylvania 19103  
USA

**OFFICIAL DELEGATES OF NATIONAL  
ADHERING ORGANIZATIONS AT XXVII  
IUPAC CONFERENCE\***

**Austria (2)**

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**Germany (6)**

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Prof. O. GLEMSER, Anorganisch-Chemisches Institut der Universität Göttingen, Hospitalstrasse 8-9, D-3400 Göttingen (Germany) (also Bureau Member, President of IUPAC Inorganic Chemistry Division)

Prof. H. KIENITZ, Badische Anilin- und Soda-Fabrik AG, Forschung B 9, D-6700 Ludwigshafen/Rhein (Germany)

Prof. W. KLEMM, Anorganisch-Chemisches Institut der Westfälische Wilhelms-Universität, Gievenbecker Weg 9, D-4400 Münster/Westfalen (Germany)

Prof. G. WILKE, Max-Planck-Institut für Kohlenforschung, Kaiser-Wilhelm-Platz 1, D-4330 Mülheim/Ruhr (Germany)

Dr. W. FRITSCHKE, Gesellschaft Deutscher Chemiker, Carl-Bosch-Haus, Varrentrappstrasse 40-42, Postfach 119075, D-6000 Frankfurt/Main 8 (Germany)

**Switzerland (4)**

Prof. H. DAHN, Institut de Chimie Organique, Université de Lausanne, 2 rue de la Barre, CH-1005 Lausanne (Switzerland)

\*See also pp. 13-18.

# CALENDAR OF IUPAC-SPONSORED MEETINGS

1973

May 15-17	Conference on Advances and Future of Macromolecular Science (Secretariat of IUPAC Conference on Advances and Future of Macromolecular Science, c/o Polymer Institute, Slovak Academy of Sciences, Dúbravská cesta, 809 34 Bratislava, Czechoslovakia)	High Tatras Štrbské Pleso (Czechoslovakia)
May 28- June 1	XI European Congress on Molecular Spectroscopy (Dr. T. SALUVERE, Secretary of Organizing Committee of XI-ECMS, c/o Institute of Cybernetics, Academy of Sciences of Estonian SSR, Lenini puistee 10, Tallinn 200001, USSR)	Tallinn (USSR)
June 25-30	XV International Conference on Coordination Chemistry (Organizing Committee of XV-ICCC, Room 350, Department of Chemistry, Lomonosov Moscow State University, Lenin Hills, Moscow 117234, USSR)	Moscow (USSR)
July 4-6	IV Canadian Wood Chemistry Symposium (Mr. T. H. G. MICHAEL, Chemical Institute of Canada, Suite 906, 151 Slater Street, Ottawa, Ontario K1P 5H3, Canada)	Quebec (Canada)
August 13-17	VI International Conference on Organometallic Chemistry (SYLVIA A. GARDNER, Secretary of Organizing Committee, VI International Conference on Organometallic Chemistry, c/o Department of Chemistry, University of Massachusetts, Amherst, Massachusetts 01002, USA)	Amherst Massachusetts (USA)
August 19-24	International Symposium on Microchemical Techniques —1973 (Mr. H. J. FRANCIS, JR., Pennwalt Corp., 900 First Avenue, King of Prussia, Pennsylvania 19406, USA)	Pennsylvania State University (USA)
August 20-23	XII Prague Microsymposium on Macromolecules: Organized Structures in Polymer Solutions and Gels (PMM Secretariat, c/o Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Petřín 1888, Praha 616, Czechoslovakia)	Prague (Czechoslovakia)
August 27-30	XIII Prague Microsymposium on Macromolecules: Transformations of Functional Groups on Polymers (PMM Secretariat, c/o Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Petřín 1888, Praha 616, Czechoslovakia)	Prague (Czechoslovakia)
August 29-31	IUPAC-IUFoST Symposium on Contribution of Chemistry to Food Supplies (Dr. A. J. COLLINGS, Unilever Research Laboratory, Colworth House, Sharnbrook, Bedfordshire, UK)	Hamburg (Germany)
September 2-7	XXIV International Congress on Pure and Applied Chemistry (Dr. W. FRITSCH, General Secretariat of XXIV IUPAC Congress, c/o Gesellschaft Deutscher Chemiker, Carl-Bosch-Haus, Varrentrappstrasse 40-42, Postfach 119075, D-6000 Frankfurt/Main 8, Germany)	Hamburg (Germany)



September 3-7	III International Conference on Chemical Thermodynamics and Symposium on Physicochemical Techniques at High Temperatures (Intercongress Reisedienst und Betreuungs GmbH, Stadiongasse 6-8, A-1010 Wien, Austria)	Baden near Vienna (Austria)
September 6-10	International Symposium on Plasma Chemistry (Prof. H. SUHR, Chemisches Institut der Universität Tübingen, Auf der Morgenstelle, D-7400 Tübingen 1, Germany)	Kiel (Germany)
September 10-14	International Symposium on Macromolecules (Dr. J. F. GIBSON, International Symposium on Macromolecules, c/o The Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Aberdeen (UK)
September 10-14	VI International Mass Spectrometry Conference (Mr. C. H. MAYNARD, Assistant General Secretary (Administration), Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK)	Edinburgh (UK)
September 17-22	International Congress on Improvement of Chemical Education (Division of Science Teaching, UNESCO, Place de Fontenoy, F-75 Paris 7 <sup>e</sup> , France)	Wroclaw (Poland)
September 18-21	International Symposium on Pore Structure and Properties of Materials (Ing. S. MODRÝ, Chairman of Organizing Committee, Symposium RILEM-IUPAC 1973, c/o Building Research Institute, Technical University of Prague, Solinova 7, Praha 6-Dejvice, Czechoslovakia)	Prague (Czechoslovakia)
1974		
January 14-18	V International Symposium on Magnetic Resonance (Prof. B. VENKATARAMAN, Chairman of Local Organizing Committee, V International Symposium on Magnetic Resonance, c/o Tata Institute of Fundamental Research, Homi Bhabha Road, Bombay 5, India)	Bombay (India)
March 24-29	IV International Conference on Crystal Growth (Conference Secretariat, Organizing Committee of ICCG-IV, Science Council of Japan, 7-22-34 Roppongi, Minato-ku, Tokyo 106, Japan)	Tokyo (Japan)
April 29- May 2	II IUPAC Conference on Physical Organic Chemistry (Prof. TH. J. DE BOER, II IUPAC Conference on Physical Organic Chemistry, c/o Laboratorium voor Organische Scheikunde, Universiteit van Amsterdam, Nieuwe Achtergracht 129, Amsterdam, Netherlands)	Noordwijkerhout near Leyden (Netherlands)
June 24-28	IX International Symposium on Chemistry of Natural Products (Prof. J. W. APŠIMON, Chairman of Organizing Committee, IX International Symposium on Chemistry of Natural Products, c/o Department of Chemistry, Carleton University, Ottawa, Ontario K1S 5B6, Canada)	Ottawa (Canada)
July 3-9	III International Pesticide Chemistry Congress (Dr. J. LARINKARI, Chairman of Organizing Committee, III International Pesticide Chemistry Congress, c/o Fabianinkatu 7B, POB 13028, SF-00130 Helsinki 13, Finland)	Helsinki (Finland)
July 10-12	IV International Conference on Nonaqueous Solvents (Dr. H. SCHINDLBAUER, IV ICNAS, c/o Verein Österreichischer Chemiker, Eschenbachgasse 9, A-1010 Wien, Austria)	Vienna (Austria)

July 26-31	International Symposium on Macromolecules (Prof. E. B. MANO, Simpósio Internacional de Macromoléculas, c/o Academia Brasileira de Ciências, Caixa Postal 229, 20.000 Rio de Janeiro, GB, Brazil)	Rio de Janeiro (Brazil)
August 19-24	XVI International Conference on Coordination Chemistry (Dr. W. J. DAVIS, Secretary of Organizing Committee, XVI-ICCC, c/o Department of Chemistry, Trinity College, University of Dublin, Dublin 2, Ireland)	Dublin (Ireland)
August	I IUPAC Conference on Synthetic Organic Chemistry (Prof. A. BRUYLANTS, II IUPAC Conference on Synthetic Organic Chemistry, c/o Laboratoire de Chimie Générale et Organique, Université de Louvain, Naamsestraat 96, B-3000 Louvain, Belgium)	Louvain (Belgium)
August	VII International Symposium on Carbohydrate Chemistry (Dr. Š. BAUER, Chairman of Organizing Committee, VII International Symposium on Carbohydrate Chemistry, c/o Institute of Chemistry, Slovak Academy of Sciences, Dúbravská cesta, 809 33 Bratislava, Czechoslovakia)	Bratislava (Czechoslovakia)
September 15-20	International Symposium on Macromolecules (Prof. J. G. FATOU, General Secretary of International Symposium on Macromolecules, Instituto de Plásticos y Caucho, c/o Juan de la Cierva No. 3, Madrid 6, Spain)	Madrid (Spain)
September 22-28	II International Symposium on Chemistry of Non-benzenoid Aromatic Compounds (Prof. H. HAFNER, Chairman of Organizing Committee, II International Symposium on Chemistry of Nonbenzenoid Aromatic Compounds, c/o Institut für Organische Chemie, Technische Hochschule Darmstadt, Schlossgartenstrasse 2, D-6100 Darmstadt, Germany)	Lindau (Germany)
September	II Symposium of Inorganic Phosphorus Compounds (Dr. W. WANĚK, Lehrstuhl für Chemie der Pädagogischen Fakultät, České Mládeže 8, Ustí Nad Labem, Czechoslovakia)	Prague (Czechoslovakia)
1976		
July 12-16	VI International Congress on Catalysis (Dr. D. A. WHAN, Secretary of Organizing Committee, VI International Congress on Catalysis, c/o Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, UK)	London (UK)

## CALENDAR OF NON-IUPAC MEETINGS

1973

May 2-4	I Internationales Symposium über Säulen-Flüssigchromatographie (Sekretariat des Schweizerischen Chemiker-Verbandes, Falkenstrasse 12, CH-8008 Zürich, Switzerland)	Interlaken (Switzerland)
June 4-6	LVI Chemical Conference and Exhibition (Chemical Institute of Canada, Suite 906, 151 Slater Street, Ottawa, Ontario K1P 5H3, Canada)	Montreal (Canada)
June 4-8	III International Specialized Symposium on Yeasts: Metabolism and Regulation of Cellular Processes (Mrs. C. WALLER, Alko, POB 350, SF-00101 Helsinki 10, Finland)	Aulanko (Finland)
June 5-7	Symposium on Mechanisms of Hydrocarbon Reactions (Dr. L. GUCZI, Scientific Secretary to Organizing Committee, c/o Institute of Isotopes, POB 77, H-1525 Budapest 114, Hungary)	Siófok Lake Balaton (Hungary)
June 5-9	XII International Congress of the Gas Industry (Organizing Committee, 62 rue de Courcelles, F-75 Paris 8 <sup>e</sup> , France)	Nizza (France)
June 18-20	International Conference on Plastics Industries in a Developing World: Role of Plastics in National Development (Plastics Institute, 11 Hobart Place, London SW1W 0HL, UK)	London (UK)
June 20-27	European Meeting of Chemical Engineering andACHEMA 1973 (DECHEMA-Sekretariat, Theodor-Heuss-Allee 25, Postfach 970146, D-6000 Frankfurt/Main 97, Germany)	Frankfurt/Main (Germany)
June 27-29	Conference on Chemical Structure-Biological Activity Relationships (Dr. M. TICHÝ, Institute of Hygiene and Epidemiology, Department of Industrial Hygiene and Occupational Diseases, Šrobárova 48, Praha 10, Czechoslovakia)	Prague (Czechoslovakia)
July 1-7	IX International Congress of Biochemistry (Secretariat, IX International Congress of Biochemistry, c/o Svenska Kemistsamfundet, Wenner-Gren Center, 6 tr, S-113 46 Stockholm, Sweden)	Stockholm (Sweden)
July 7-14	V International Conference on Science and Society: Scientific, Technological and Social Development—Aims and Values (Udruženje Nauka i Društvo, Organizacioni odbor V međunarodne konferencije, POB 163, Yu-11001 Beograd, Yugoslavia)	Herceg-Novi (Yugoslavia)
July 9-15	XVI Reunión Bienal de la Real Sociedad Española de Física y Química (Sr. Secretario General de la Comisión Organizadora de la XVI Reunión Bienal de la Real Sociedad Española de Física y Química, Facultad Ciencias, Universidad de Oviedo, C/. Calvo Sotelo, Oviedo, Spain)	Oviedo (Spain)
July 10-13	III International Symposium on Synthesis in Organic Chemistry (Dr. J. F. GIBSON, Chemical Society, Burlington House, Piccadilly, London W1V 0BN, UK)	Oxford (UK)



July 22-28	V Interamerican Congress of Chemical Engineering (J. M. CHARRIER, Department of Chemical Engineering, McGill University, POB 6070, Montreal 101, Canada)	Rio de Janeiro (Brazil)
August 22-24	XVII Canadian High Polymer Forum (Chemical Institute of Canada, Suite 906, 151 Slater Street, Ottawa, Ontario K1P 5H3, Canada)	St. Jean Quebec (Canada)
August 27-31	III International Symposium on Gas Kinetics (Dr. G. R. DEMARE, Laboratoire de Chimie Physique Moléculaire, Université Libre de Bruxelles, 50 avenue F. D. Roosevelt, B-1050 Bruxelles, Belgium)	Brussels (Belgium)
August 29- September 4	VII International Conference on Photochemistry (Prof. G. STEIN, Department of Chemistry, Hebrew University of Jerusalem, Jerusalem, Israel)	Jerusalem (Israel)
September 3-6	International Symposium on Liquid Scintillation Counting (Society for Analytical Chemistry, 9-10 Savile Row, London W1X 1AF, UK)	Brighton (UK)
September 3-7	III International Conference on Molecular Sieves (Prof. W. M. MEIER, Institut für Kristallographie der Eidgenössische Technische Hochschule, Sonneggstrasse 5, CH-8006 Zürich, Switzerland)	Zürich (Switzerland)
September 3-7	V International Conference on Mössbauer Spectrometry (Prof. J. CIRÁK, Department of Nuclear Physics and Techniques, Slovak Technical University, Vazovova 1b, Bratislava, Czechoslovakia)	Bratislava (Czechoslovakia)
September 4-7	XI International Symposium on Free Radicals (G. VON BÜNAU, Max-Planck-Institut für Kohlenforschung, Abteilung Strahlenchemie, Stiftstrasse 34-36, D-4330 Mülheim/Ruhr, Germany)	Berchtesgaden-Königssee (Germany)
September 9-14	IV International Symposium on Fresh Water from the Sea (DECHEMA-Sekretariat, Theodor-Heuss-Allee 25, Postfach 970146, D-6000 Frankfurt/Main 97, Germany)	Heidelberg (Germany)
September 10-12	International Symposium on Ambident Reactivity (Dr. P. W. HICKMOTT, Department of Chemistry and Applied Chemistry, University of Salford, Salford M5 4WT, UK)	Salford (UK)
September 10-14	VII International Hot Atom Chemistry Symposium (Prof. G. STÖCKLIN, Institut für Nuklearchemie der Kernforschungsanlage Jülich GmbH, D-5170 Jülich, Germany)	Jülich (Germany)
September 17-21	International Conference on Chemistry and Uses of Molybdenum (Dr. E. R. BRAITHWAITE, Climax Molybdenum Co. Ltd., Villiers House, 41-47 Strand, London WC2N 5JS, UK)	Reading (UK)
September 24-28	V European Congress of Corrosion (Société de Chimie industrielle, 80 route de St-Cloud, F-92 Rueil-Malmaison, France)	Paris (France)
September 25-28	EUCHEM Conference on Stereochemistry and Mechanism of Silicon and Phosphorus Reactions (Prof. R. CORRIU, Laboratoire de Chimie des Organométalliques, Université des Sciences et Techniques du Languedoc, Place Eugène Bataillon, F-34060 Montpellier, France)	Montpellier (France)

October 1-5	International Congress on Fluidization and its Applications (Société de Chimie industrielle, 80 route de St-Cloud, F-92 Rueil-Malmaison, France)	Toulouse (France)
October 10-15	V. Europäisches Symposium "Lebensmittel—Einfluss der Rheologie auf die Lebensmittelverarbeitung und die Lebensmitteleigenschaften" (Gesellschaft Deutscher Chemiker, Carl-Bosch-Haus, Varrentrappstrasse 40-42, Postfach 119075, D-6000 Frankfurt/Main 90, Germany)	Zürich (Switzerland)
October 22-26	III International Symposium on Polyhalogen Compounds (Instituto de Química Orgánica de Barcelona, Patronato Juan de la Cierva, Calle Jorge Girona Salgado, Barcelona 17, Spain)	Barcelona (Spain)
October 25-27	International Symposium on Specific Control of Polymer Structures and Resulting Properties (Prof. PH. TEYSSIÉ, Laboratoire de Chimie Macromoléculaire et de Catalyse Organique, Université de Liège au Sart-Tilman, B-4000 Liège, Belgium)	Liège (Belgium)
October 29–November 2	IV International Conference on Atomic Spectroscopy (Dr. M. WAR, National Research Council of Canada, Ottawa, Ontario K1A 0R6, Canada)	Toronto (Canada)

## IUPAC COLLEAGUES DECEASED

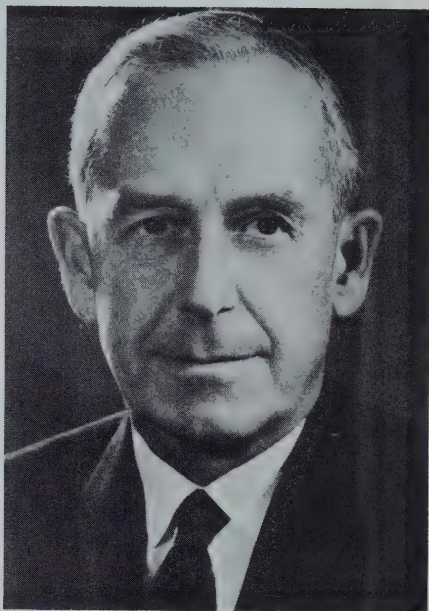
We have been informed of the death of:

- Finland* Prof. A. RINGBOM (21 December 1972)—Sous-Commission des Données de Solubilité (1953-1955), Commission on Equilibrium Data (1955-1965), Section of Analytical Chemistry Committee (1957-1961), Council (1959, 1961).
- Netherlands* Dr. H. W. TALEN (15 February 1973)—Section on Organic Coatings (1951-).

Presidents of  
Physical Chemistry Division



Prof W A Noyes Jr USA 1949-1951



Dr E W R Steacie Canada 1951-1953



Prof M Letort France 1953-1957



Prof W Kuhn Switzerland 1957-1961

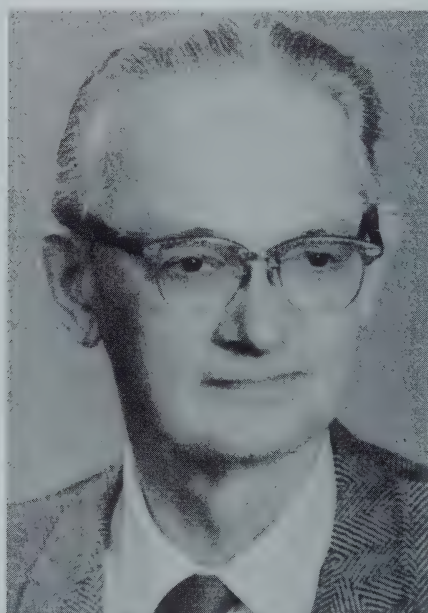




Prof G M Schwab Germany 1961-1965



Sir Harry Melville UK 1965-1969



Dr G Waddington USA 1969-1973

## LIST OF ABBREVIATIONS

ACHEMA	Ausstellungstagung für Chemisches Apparatewesen
ACS	American Chemical Society
AOAC	Association of Official Analytical Chemists
AOCS	American Oil Chemists Society
ASMS	American Society for Mass Spectrometry
ASTM	American Society for Testing and Materials
BIPM	Bureau International des Poids et Mesures
BSI	British Standards Institution
CAS	Chemical Abstracts Service
CBN	IUPAC-IUB Commission on Biochemical Nomenclature
CEE	Communauté Européenne Economique
CID	Comité International des Dérivés Tensio-Actifs
CIPM	Comité International des Poids et Mesures
CNOC	IUPAC Commission on Nomenclature of Organic Chemistry
CODATA	ICSU Committee on Data for Science and Technology
COWAR	ICSU Scientific Committee on Water Research
DECHEMA	Deutsche Gesellschaft für Chemisches Apparatewesen
DGF	Deutsche Gesellschaft für Fettwissenschaft
DPG-MS	Deutsche Physik Gesellschaft-Massen Spektroskopie
EFCE	European Federation of Chemical Engineering
EUSIDIC	European Association of Scientific Information Dissemination Centres
FAO	UN Food and Agriculture Organization
FDA	US Food and Drug Administration
FEMA	US Food and Essence Manufacturers Association
GAMS	Groupement pour l'Avancement des Méthodes Physiques d'Analyse
IACSS	International Aflatoxin Check Sample Series
IARC	WHO International Agency for Research on Cancer
IASC	International Association of Seed Crushers
ICC	International Association for Cereal Chemistry
ICSU	International Council of Scientific Unions
ICSU-AB	ICSU Abstracting Board
IDF	International Dairy Federation
IOFI	International Organization of the Flavour Industry
IOOC	International Olive Oil Council
IP	UK Institute of Petroleum
ISO	International Organization for Standardization
ISO/TC	ISO Technical Committee
IUB	International Union of Biochemistry
IUCr	International Union of Crystallography
IUFoST	International Union of Food Science and Technology
MSSJ	Mass Spectrometry Society of Japan
NNI	Institut Néerlandais de Normalisation
OECD	Organization for Economic Cooperation and Development
OICC	Office International de Cacao et du Chocolat
PAG	Protein Advisory Group of FAO/WHO/UNICEF
SCOPE	ICSU Scientific Committee on Problems of the Environment
SI	Système Internationale
UN	United Nations
UNESCO	UN Educational, Scientific and Cultural Organization
UNICEF	UN Children's Fund
UNISIST	UNESCO-ICSU Programme on International Science Information System
WHO	UN World Health Organization

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